

**SONY®**

PORTABLE VIDEOCASSETTE RECORDER

# **BVW-35P**



**BETACAM SP™**

MAINTENANCE MANUAL  
Volume 1 3rd Edition  
Serial No. 11744 and Higher  
EBU N-10 LEVEL

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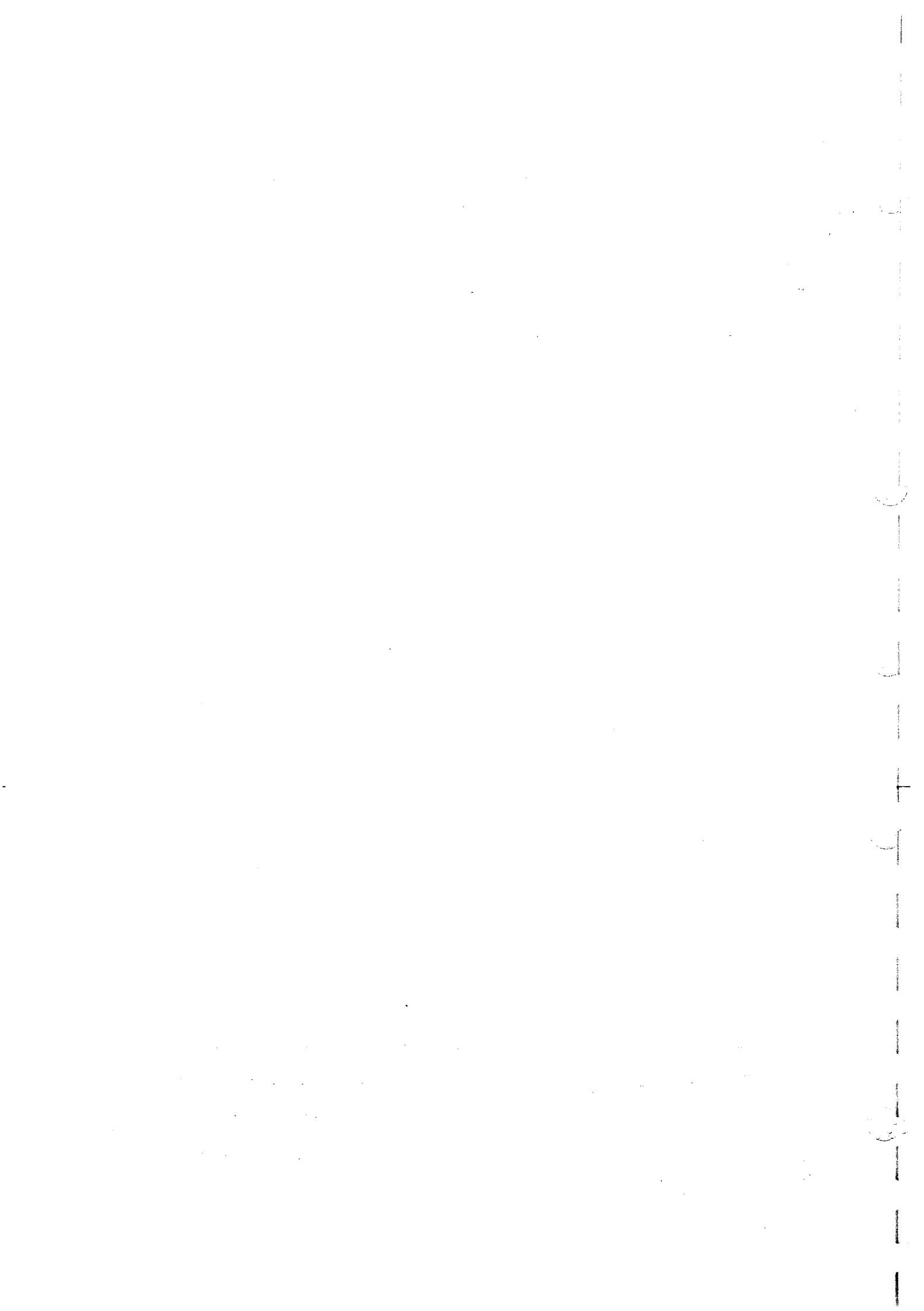
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UPDATE INFORMATION

MODEL NAME                   B V W - 3 5 P (E K) Maintenance manual Vol.2  
REVISION NO.                4th Edition  
DATE                         Oct/ 10/89

Rev. No	S. No.	Action	Page
E4	11744- 11838	Add	Addition of boards. (Board name; ENC-11P, DEC-49P, KY-110P)

- 1) "Rev. No." is the corresponding revised number of the service manual for the customer.  
E1 R1 means 1st Edition Revised 1.  
"Serial Number" is the serial number range which the Rev.No. in the left column covers.
- 2) The changed portions are indicated by dotted line and/or "\*\*" (double asterisk).
- 3) "N.A." in the serial number column means there is no machine covering this revision.  
The machine for the different market, e.g. Japan, may exist for this manual revision.



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### 16. SPARE PARTS AND FIXTURE

## SECTION 1

### TECHNICAL INFORMATION

#### 1-1. SPECIFICATIONS

##### Mechanical

Weight : 6.7 kg  
Dimensions : 296 x 140 x 348 mm (w/h/d)  
including projecting parts and controls  
Operating position : Both vertical and horizontal  
Tape transport mechanism : Betacam system  
Video cassettes : 1/2-inch Betacam, Betacam SP cassette  
. Oxide tape  
BCT-5K, BCT-10K, BCT-20K, BCT-30K or  
equivalent  
. Metal tape  
BCT-5M, BCT-10M, BCT-20M, BCT-30M or  
equivalent  
Tape speed : 101.5 mm/sec.  
REC/PLAY time : maximum 36 min. (With a BCT-30M video  
cassette)  
Fast forward time : Less than 3.5 minutes (With a BCT-30M video  
cassette)  
Rewind time : Less than 3 minutes (With a BCT-30M video  
cassette)  
Continuous Operating time : Approx. 70 minutes with a fully charged  
battery pack BP-90 when operated with a  
BVP-5P video camera.

##### Connectors

VIDEO IN : BNC x 1  
CAMERA : 26-pin multi x 1  
VIDEO OUT 1, 2 : BNC x 1 in each  
DUB/COMPONENT OUT : 12-pin multi x 1  
AUDIO IN CH-1, CH-2, CH-3, CH-4  
: XLR, 3-pin, female x 1 in each  
AUDIO OUT CH-1, CH-2, CH-3, CH-4  
: XLR, 3-pin, male x 1 in each

SC IN	: BNC x 1
TC IN	: BNC x 1
TC OUT	: BNC x 1
EARPHONE	: Stereo mini jack x 1
HEADPHONES	: Stereo phone jack x 1
REMOTE	: 9-pin multi x 1 (RS-422A)
UHF OUT	: IEC-type standard aerial connector x 1
Operating temperature	: 0°C to 40°C
Storage temperature	: -20°C to +60°C
Operating humidity	: Less than 85 % (relative humidity)
<b>Electrical</b>	
Power requirements	: DC12V BP-90 battery pack (Ni-Cd, 3.5Ah), or two NP-1 battery packs (Ni-Cd, 1.5Ah), or two NP-1A battery packs (Ni-Cd, 1.7Ah) AC power source operation possible using the AC-500CE AC power adaptor (optional)
Power consumption	: REC mode : 34 W (component REC mode : 30 W) PLAY mode : 30 W STOP mode : 2 W

## VIDEO

Video recording system	
Luminance	: FM
Chrominance	: Compressed time division multiplex FM
Bandwidth	
Luminance (50%)	: Metal tape; 25 Hz to 5.5 MHz +0.5 dB, -3.0 dB Oxide tape; 25 Hz to 4.0 MHz +0.5 dB, -6.0 dB
Chrominance (50%)	: Metal tape and Oxide tape 25 Hz to 1.5 MHz +0.5 dB, -3.0 dB
Signal-to-noise ratio	
Luminance	: Metal tape; More than 48 dB Oxide tape; More than 46 dB
Color difference	: Metal tape; More than 48 dB Oxide tape; More than 45 dB

K-factor (2T pulse)	: Metal tape; Less than 2 % Oxide tape; Less than 3 %
Y/C delay	: Metal tape and Oxide tape; Less than 20 nsec
Low frequency non-linearity	Metal tape; Less than 3% Oxide tape; Less than 4%
<b>Input</b>	
VIDEO IN	: Composite, 1.0 Vp-p, 75 ohms Advance Sync, 4.0 Vp-p, 75 ohms
CAMERA	: Composite, 1.0 Vp-p, 75 ohms Component, Luminance 1.0 Vp-p, 75 ohms Chrominance R-Y 0.7 Vp-p <sup>*3</sup> (100% color bars) 75 ohms B-Y 0.7 Vp-p <sup>*3</sup> (100% color bars), 75 ohms
SC IN	: 2 Vp-p ± 1.0 V, 75 ohms, unbalanced
<b>Output</b>	
VIDEO OUT 1, 2	: Composite, 1.0 Vp-p, 75 ohms, sync negative
DUB/COMPONENT OUT	: Luminance 1.0 Vp-p, 75 ohms, sync negative Chrominance R-Y 0.7 Vp-p <sup>*3</sup> (100% color bars), 75 ohms B-Y 0.7 Vp-p <sup>*3</sup> (100% color bars), 75 ohms
UHF OUT	: for TV channel 30 to 38 (adjustable), system 1/3 (selectable)
<b>AUDIO</b>	
Audio recording system	: LNG; Bias : AFM; FM
Frequency response: *1 (20dB below peak level)	
LNG	: Metal tape; 50 Hz to 15 kHz +1.5 dB, -3.0 dB Oxide tape; 50 Hz to 15 kHz ± 3.0 dB
AFM	: Metal tape; 20 Hz to 20 kHz +0.5 dB, -2.0 dB

Note: \*1) peak level—AFM: +19VU, LNG: +8VU

\*2) referred to peak level, weighted CCIR 468-3, with Audio N.R.

\*3) The input/output level of a component signal conforms to  
the EBU N-10 standard.

**Dynamic range:**

AFM : Metal tape; More than 80 dB

**Signal-to-noise ratio:<sup>\*2</sup>**

LNG : Metal tape; More than 62 dB

Oxide tape; More than 58 dB

AFM : Metal tape; More than 68 dB

**Distortion (at 1kHz):**

LNG : Metal tape; Less than 3 % (<sup>\*1</sup> at peak level)

Less than 1.5% (at 0VU level)

Oxide tape; Less than 3 % (<sup>\*1</sup> at peak level)

Less than 2% (at 0VU level)

AFM : Metal tape; Less than 3 % (<sup>\*1</sup> at peak level)

Less than 0.5% (at 0VU level)

**Cross talk (at 1kHz):**

LNG : Metal tape and Oxide tape; Less than -55 dB

AFM : Metal tape; Less than -65 dB

**Wow and flutter (DIN45507):**

LNG : Metal tape and Oxide tape; Less than 0.15 % rms

**Depth erasure (at 1kHz):**

LNG : Metal tape and Oxide tape; More than 65 dB

**Input**

CAMERA : -60/-20/+4 dB (selectable)  
impedance more than 3 k ohms, balanced

AUDIO IN CH-1, CH-2, CH-3, CH-4  
: -60/-20/+4 dB (selectable)  
impedance more than 3 k ohms, balanced

**Output**

AUDIO OUT CH-1, CH-2, CH-3, CH-4  
: +4 dBm (600-ohm load), balanced

EARPHONE : max. -20 dBs (8-ohm load), adjustable

HEADPHONES : max. -20 dBs (8-ohm load), adjustable

**TIME CODE**

Input (TC IN) : 0.5 to 18 Vp-p, impedance more than  
10 k ohms, unbalanced

Output (TC OUT) : 2.2 Vp-p ± 3 dB (600-ohm load), unbalanced  
1.2 Vp-p ± 3 dB (75-ohm load), unbalanced

**Note:** \*1) peak level — AFM: +19VU, LNG: +8VU

\*2) referred to peak level, weighted CCIR 468-3, with Audio N.R.

## 1-2. PRINTED CIRCUIT BOARDS

Circuit information is provided below.

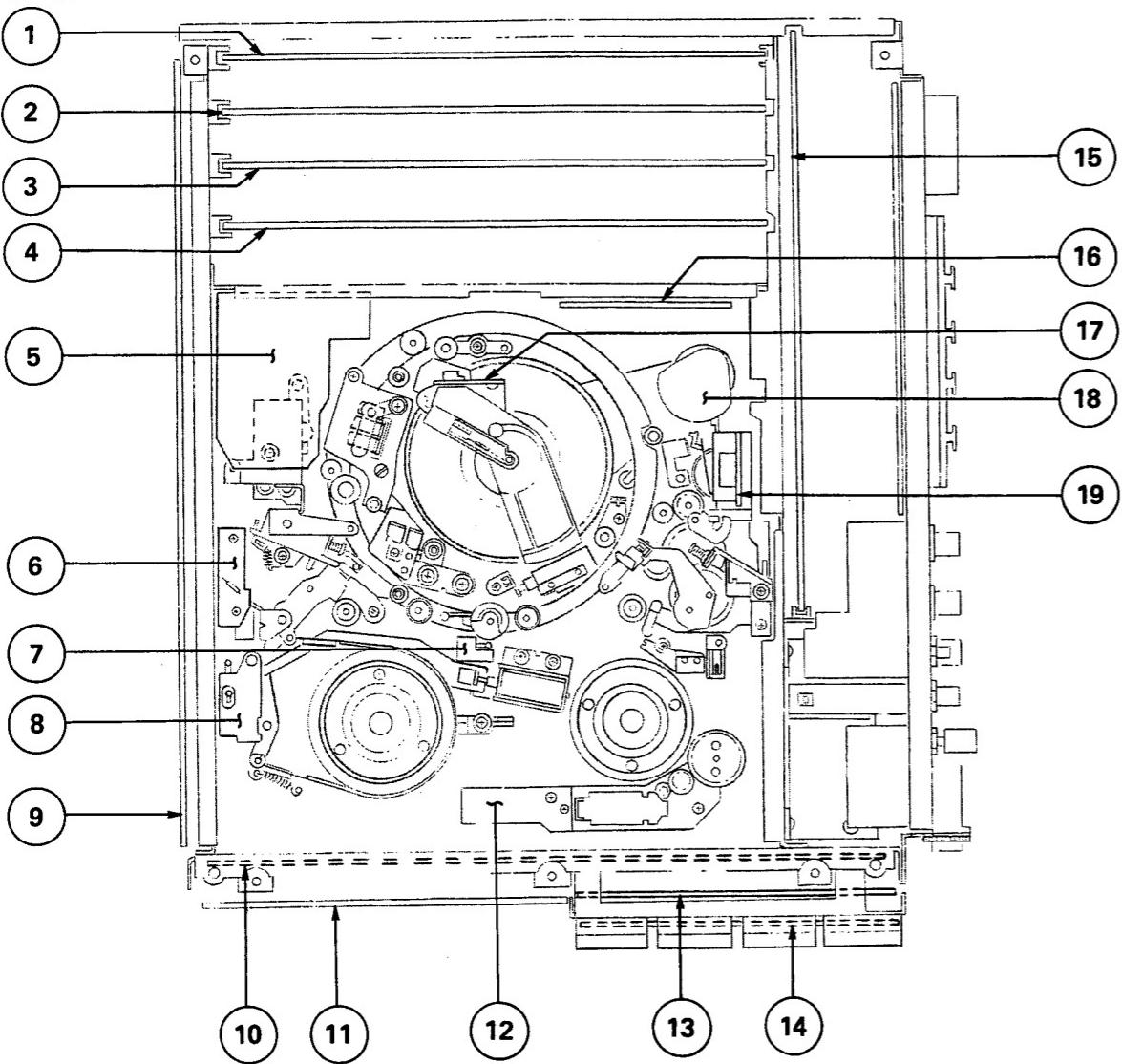
System	Board	Circuit function	System	Board	Circuit function
VIDEO	BF-29	Video Input Level/Buffer	AUDIO	MA-28	Mic Amplifier
	DEC-49P	Y/C Separator/Decoder		MT-34	Meter Drive/Audio Level
	MDM-3P	Modulator/Demodulator		VR-64	PB Level
	DL-13	1H Delay Line for DOC		AU-93P	Audio REC/PB Amplifier
	DM-58A	Demodulator		AFM-3	FM Audio
	DO-19	DO Detector		AL-14	AGC/Limiter
	DUS-277	RF Switch		AR-12P	REC Amplifier
	EQ-14	COS Equalizer		CO-8	CONF1 PB
	EQ-14A	COS Equalizer		DC-33	DUB Crosstalk Canceller
	FL-66	Filter		NR-19	Noise Reduction
	PA-60A	PB Amplifier		SG-137	REF Clock Generator
	RF-16A	RF AGC		VA-68	AGC
	RG-24	+5V Regulator		MS-22	Monitor Amplifier/Monitor Selector
	TG-31	Timing Generator		CP-114	XLR OUT Amplifier
	VA-54	Video Amplifier		VR-63	Phone Level
	VRA-1	Video REC Amplifier		HP-36	Headphones/Earpiece
	CEC-3P	CTDM/Expander		CD-54	DC-DC Converter
	CF-29	Comb Filter		DD-17V	DC-DC Converter
	CL-15	Clamper for DL-15 OUT Signals		MTS-2	CH-4/Monitor Switch
	CL-16	Clamper for DL-15 IN Signals		ASW-7	Audio Front Switch
	DL-14	1H Delay Line	SERVO	SV-94P	Servo System
	DL-15	1/2H, 1H Delay Line		SD-16P	Servo Driver
	DL-17	1H Delay Line for CF		DR-63	Drum Motor
	ED-18	Edge Detector	TIME CODE	TC-45P	Time Code REC/PB Amplifier
	EQ-23	Delay Circuit		KY-110P	Function Key/Time Code
	LM-15	Limiter for Pre-phaser		SY-110	System Control
	LM-16	Limiter for REC 100 % CTDM signal		CS-22	SP Cassette-in Switch
	NR-18	Noise Canceller for PB CTDM Signal	SYSTEM	DU-39	Eject Motor
	ENC-11P	Video Encoder/Y Processor		SW-24	Unthreading-end Switch
				SW-203	Miss REC/Cassett e-in Switch
				SWC-3	Tension Regulator Switch

System	Board	Circuit function
POWER	BC-14	Battery
	DC-DC CONV.	DC-DC Converter
	DC-35	DC IN/Diode
	PSW-8	Power Switch Control
OTHER	CN-185	CP Connection Board
	CON-12	BNC Connector
	DS-23	Dew Connection Board
	EX-150	Extension Board
	MB-157	Mother Board
	DE-19	Level Detector
	PA-67P	RF REC/PB Amplifier
	RM-54	9P Remote Control
	RMD-1	RF Modulator
	SR-41	Slip-ring

**1-3. LOCATION OF MAIN PARTS**

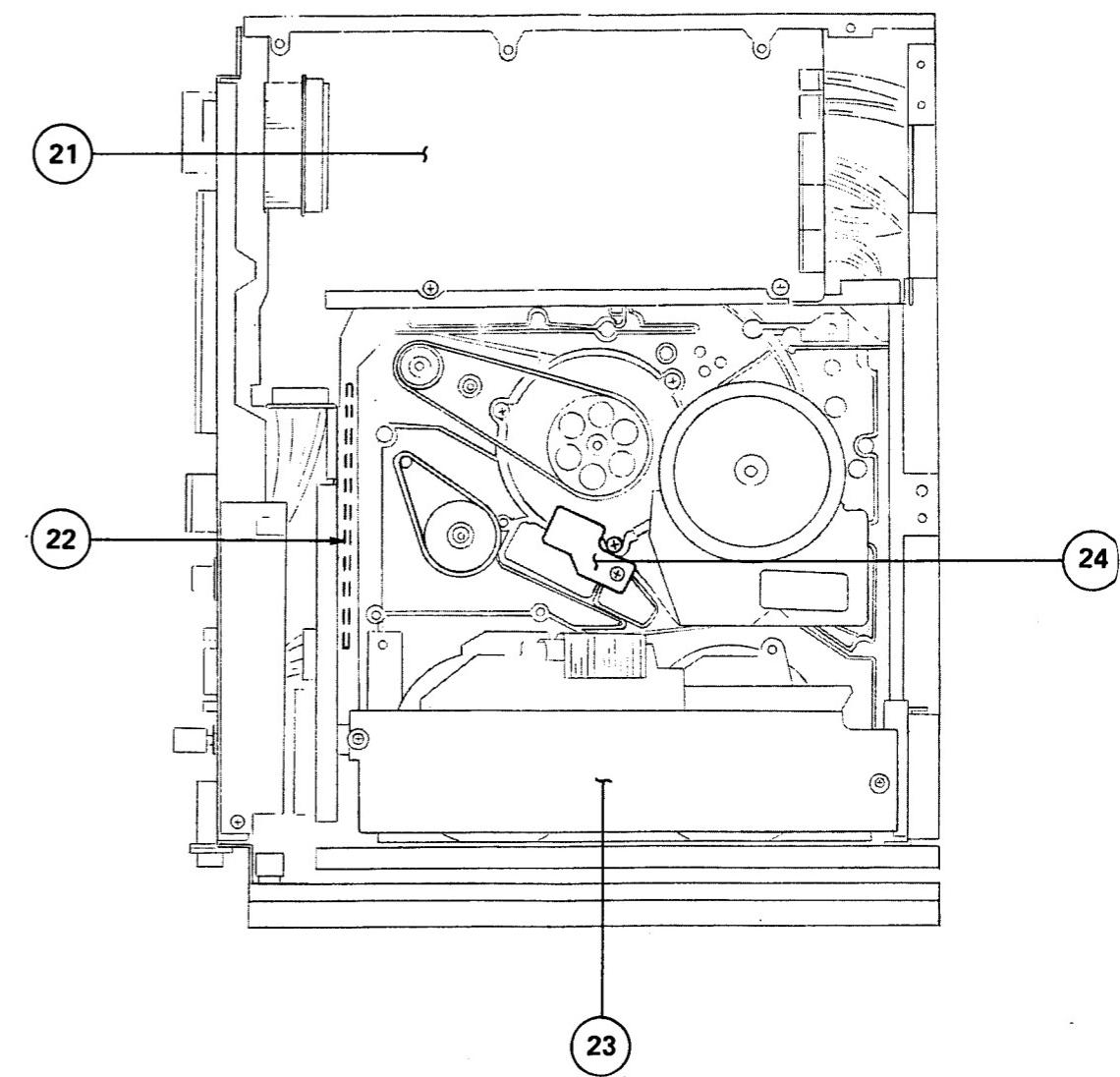
**1-3-1. Location of the Printed Circuit Boards**

(TOP VIEW)



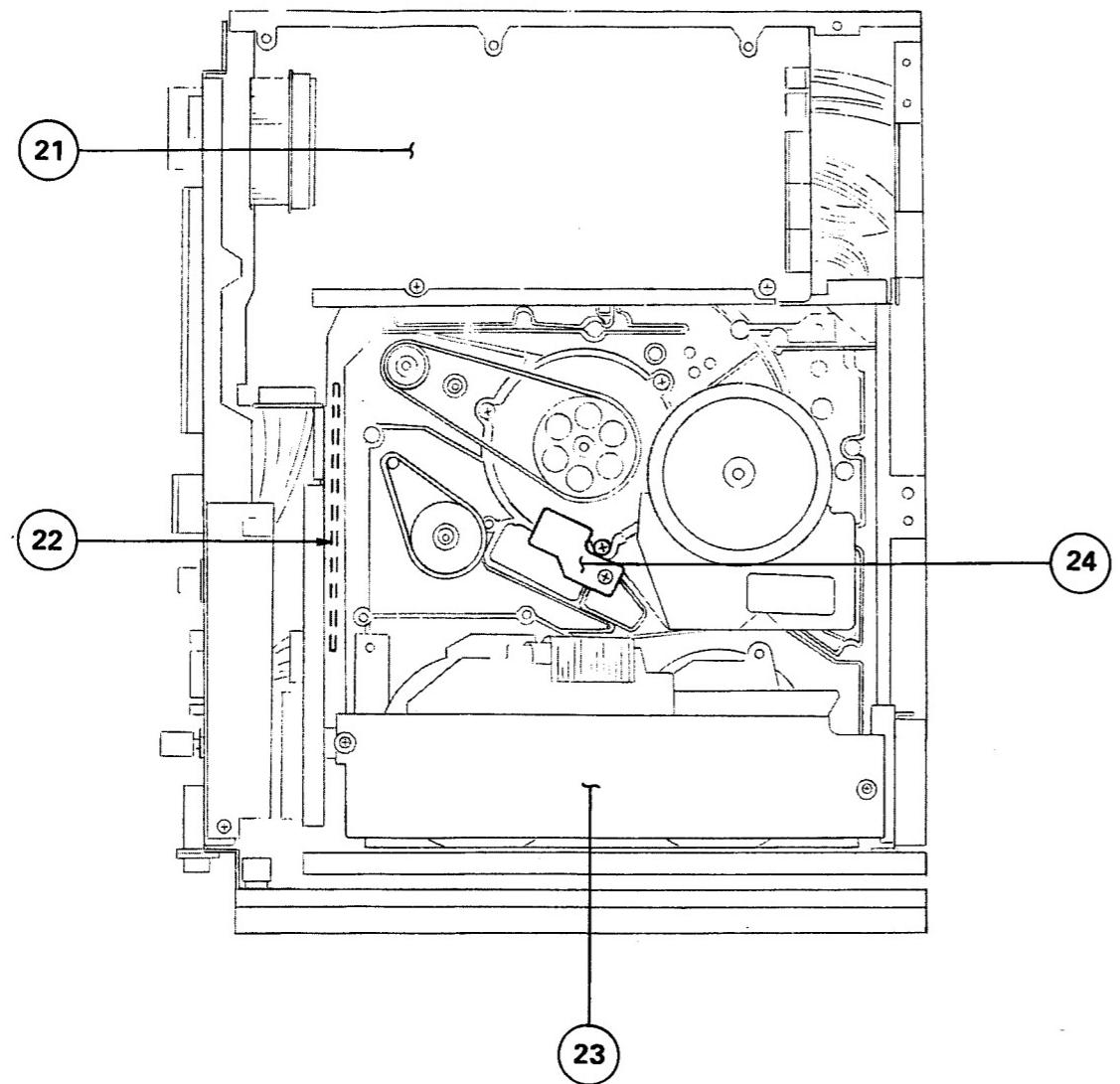
- |  |   |
|--|---|
| 1 DEC-49P Board  | 9 SV-94P Board  |
| 2 CEC-3P Board (with CF-29, CL-15, CL-16,<br>DL-14, DL-15, DL-17, ED-18, EQ-23, LC-11,<br>LM-15, LM-16 and NR-18 Boards)       | 10 SY-110 Board   |
| 3 ENC-11P Board  | 11 KY-110P Board  |
| 4 MDM-3P Board (with DL-13, DM-58A, DO-19,<br>DUS-277, EQ-14, EQ-14A, FL-66, PA-60A, RF-16A,<br>RG-24, TG-31 and VA-54 Boards) | 12 DU-39 Board  |
| 5 VRA-1 Board  | 13 MT-34 Board (with VR-64 Board)   |
| 6 SWC-3 Board  | 14 ASW-7 Board  |
| 7 CS-22 Board  | 15 AU-93P Board (with AFM-3, AL-14, AR-12P,<br>CO-8, DC-33, NR-19, SG-137 and VA-68 Boards) |
| 8 SW-203 Board   | 16 TC-45P Board   |
|  | 17 SR-41 Board  |
|  | 18 DR-63 Board  |
|  | 19 SW-24 Board  |

(BOTTOM VIEW)



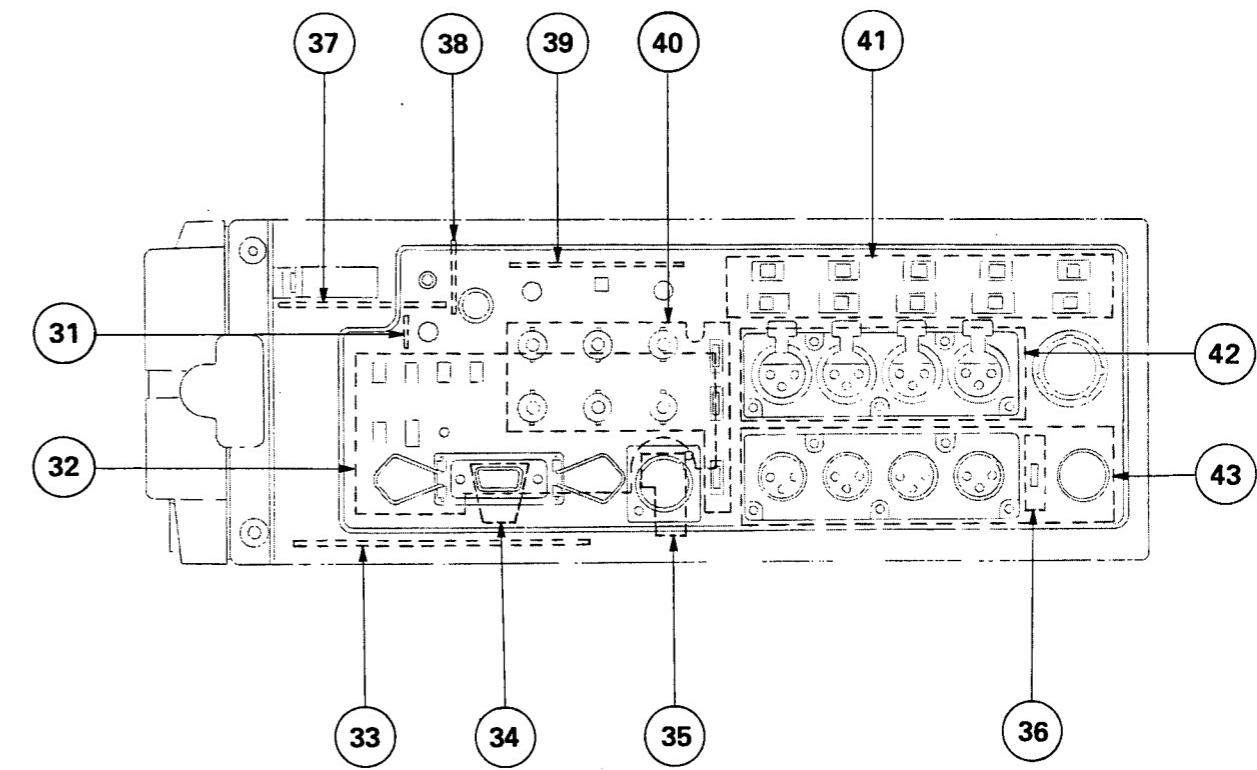
- |  |
|--|
| 21 MB-157 Board (with DE-19 Board)             |
| 22 BC-14 Board (installed in the Battery Case) |
| 23 SD-16P Board                                |
| 24 DS-23 Board                                 |

(BOTTOM VIEW)



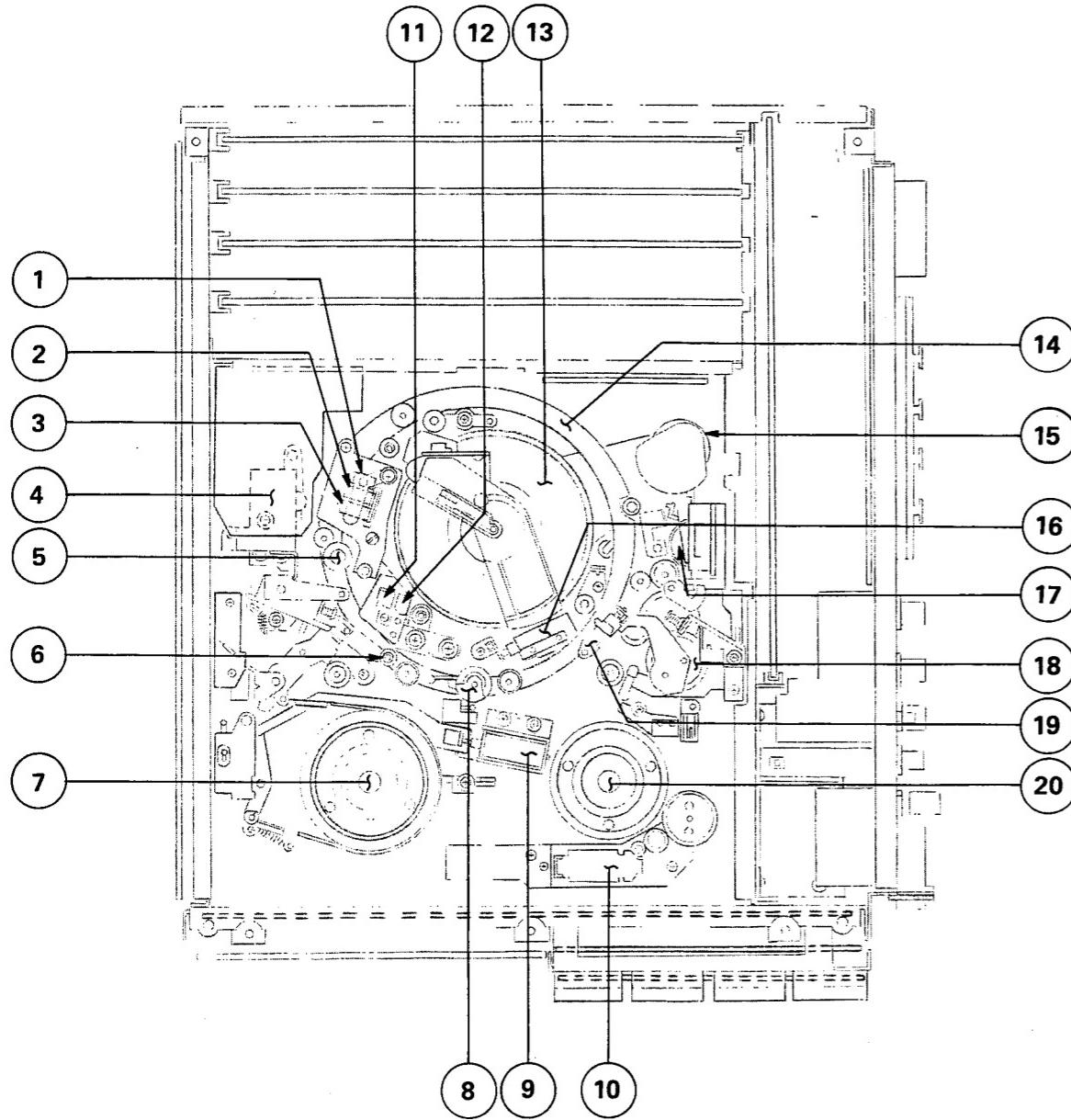
- 21 MB-157 Board (with DE-19 Board)
- 22 BC-14 Board (installed in the Battery Case)
- 23 SD-16P Board
- 24 DS-23 Board

(CONNECTOR PANEL SIDE)



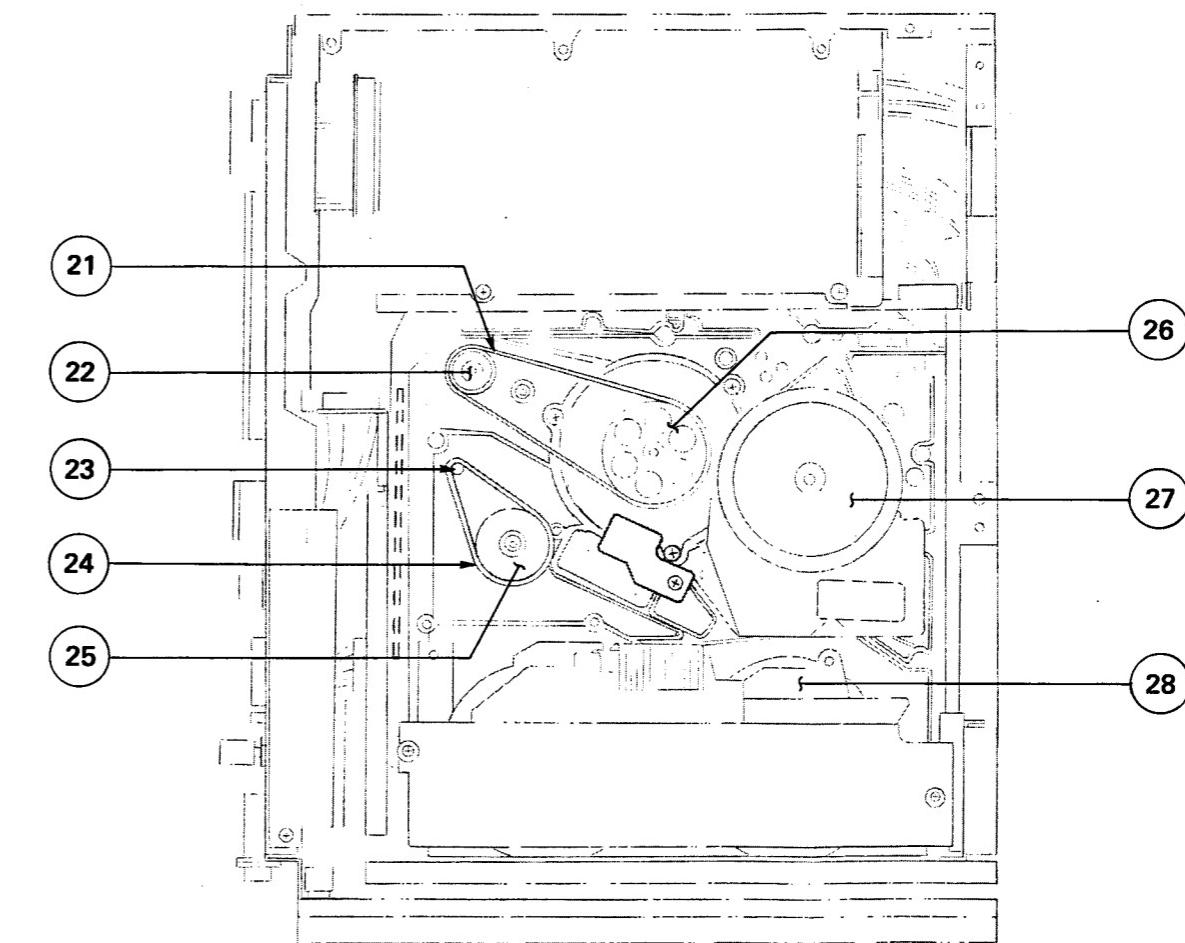
- 31 VR-63 Board
- 32 MS-22 Board
- 33 PSW-8 Board
- 34 RM-54 Board
- 35 DC-35 Board
- 36 MTS-2 Board
- 37 HP-36 Board
- 38 RMD-1 Board
- 39 BF-29 Board
- 40 CON-12 Board
- 41 MA-28 Board
- 42 CP-114 Board
- 43 CN-185 Board

**1-3-2. Location of the Main Mechanical Parts/Components**  
**(TOP VIEW)**



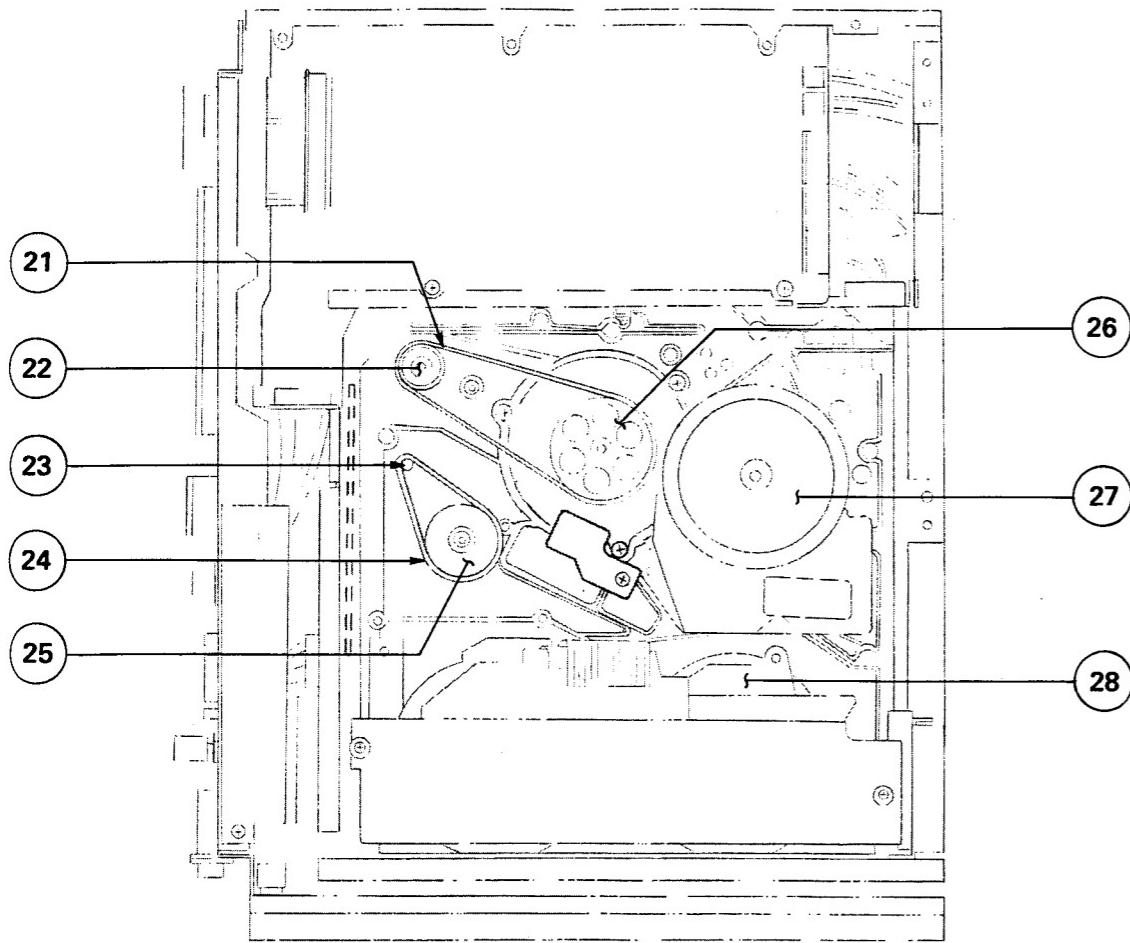
- |                         |                       |
|-------------------------|-----------------------|
| 1 Audio/Erase Head      | 11 Full Erase Head    |
| 2 Audio/TC Head         | 12 CTL Head           |
| 3 Audio/Confidence Head | 13 Head Drum          |
| 4 Pinch Solenoid        | 14 Threading Ring     |
| 5 Capstan Shaft         | 15 Drum Motor         |
| 6 Tension Regulator Arm | 16 Eject Solenoid     |
| 7 Supply Reel Table     | 17 Threading Motor    |
| 8 Pinch Roller          | 18 Gear Block         |
| 9 Tension Solenoid      | 19 Slant Guide        |
| 10 Eject Motor          | 20 Take-up Reel Table |

**(BOTTOM VIEW)**



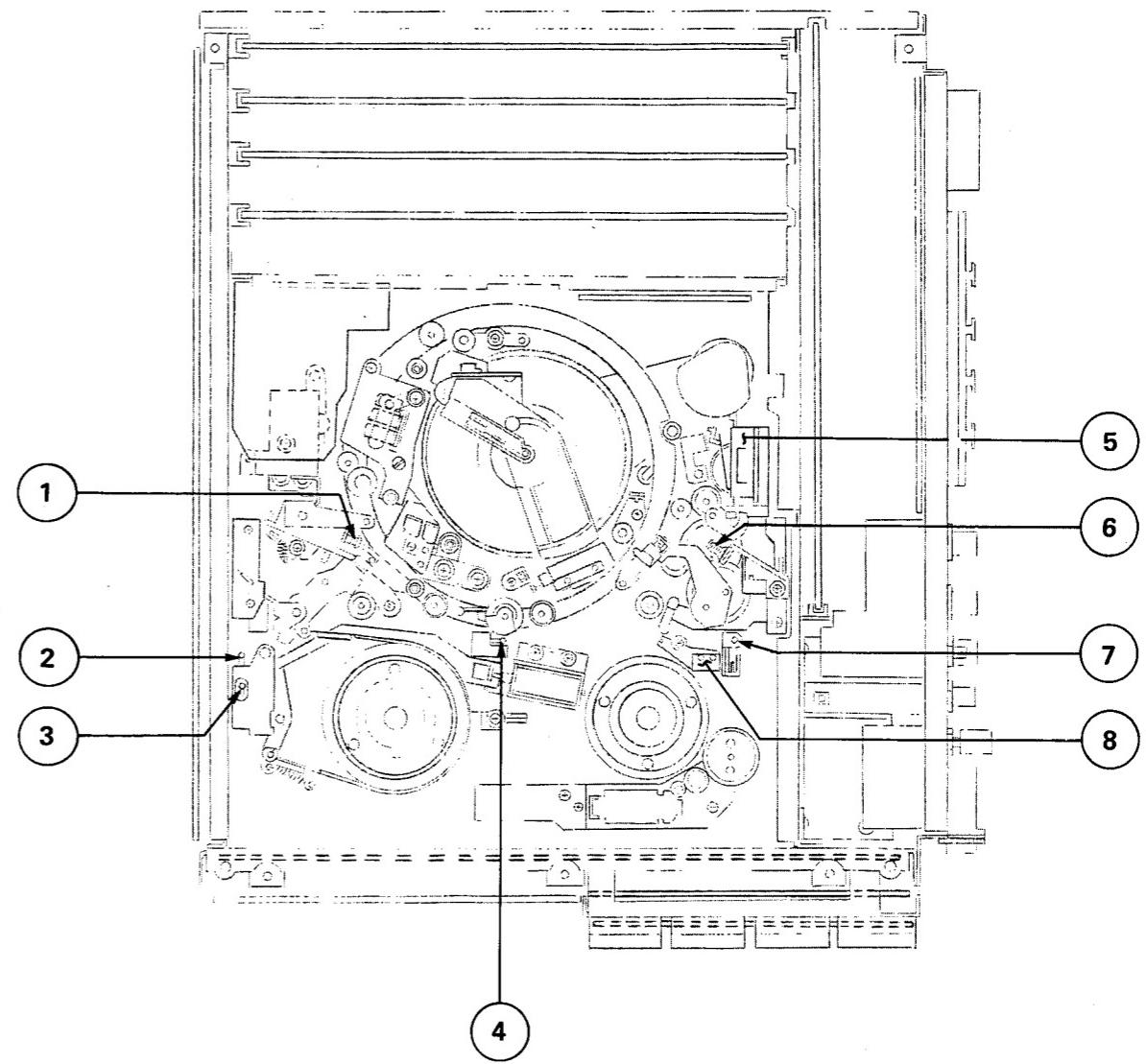
- |                           |
|---------------------------|
| 21 Drum Belt              |
| 22 D Motor Pulley         |
| 23 Threading Motor Pulley |
| 24 Threading Motor Belt   |
| 25 Deceleration Pulley    |
| 26 Drum Pulley            |
| 27 Capstan Motor          |
| 28 Reel Motor             |

OTTOM VIEW)



- 21 Drum Belt
- 22 D Motor Pulley
- 23 Threading Motor Pulley
- 24 Threading Motor Belt
- 25 Deceleration Pulley
- 26 Drum Pulley
- 27 Capstan Motor
- 28 Reel Motor

1-3-3. Location of the Sensors and Switches



- 1 Tape End Sensor
- 2 Miss-REC Switch (for Metal tape)
- 3 Cassette-in Switch
- 4 Oxide/Metal tape Detection Switch
- 5 Unthread End Switch
- 6 Tape Beginning Sensor
- 7 Miss-REC Switch (for Oxide tape)
- 8 Cassette Lock Switch

#### 1-4. CONNECTION CONNECTORS

When external cables are connected to the various connectors on the connector panel during maintenance, the hardware listed below (or equivalents) must be used.

Panel indication	Connection connector
VIDEO IN	1-560-069-11
VIDEO OUT 1/2	PLUG, BNC, male
SC IN	
TC IN	
TC OUT	
AUDIO IN	1-508-084-00 Connector, XLR, 3P, male
AUDIO OUT	1-508-083-00 Connector, XLR, 3P, female
CAMERA	1-564-183-00 PLUG, 26P, male
DC IN 12 V	1-508-362-00 Connector, XLR, 4P, female
DUB/COMPONENT OUT	1-560-995-00 PLUG, 12P, male
UHF OUT	1-508-459-00 AERIAL
REMOTE	1-560-651-00 Connector (M), 9P 1-561-749-00 JUNCTION SHELL, 9P

#### 1-5. INPUT/OUTPUT SIGNAL OF THE CONNECTOR

INPUT	
VIDEO	
VIDEO IN	: Composite, 1.0 Vp-p, 75 ohms Advance Sync 4.0 Vp-p, 75 ohms
CAMERA	: Composite, 1.0 Vp-p, 75 ohms Component, Luminance 1.0 Vp-p R-Y/B-Y 0.7 Vp-p * <sup>1</sup> (100% color bars), 75 ohms
AUDIO	
CAMERA	: -60/-20/+4 dB, selectable Audio channel 1/2/3/4 selectable impedance more than 3 k ohms, balanced
CH-1, CH-2, CH-3 and CH-4	: -60/-20/+4 dB, selectable impedance more than 3 k ohms, balanced
TC IN	: 0.5 to 18 Vp-p, impedance, more than 10 k ohms, unbalanced
SC IN	: 2 Vp-p ± 1.0 V, 75 ohms, unbalanced
OUTPUT	
VIDEO OUT 1, 2	: Composite, 1.0 Vp-p, 75 ohms, sync negative
DUB/COMPONENT OUT	: Luminance; 1.0 Vp-p, 75 ohms, sync negative Chrominance; R-Y/B-Y, 0.7 Vp-p (100% color bars) 75 ohms
AUDIO OUT	
CH-1, CH-2, CH-3 and CH-4	: +4 dBm (600-ohm load), balanced
EARPHONE	: max. -20 dBs (8-ohm load), Adjustable
HEADPHONES	: max. -20 dBs (8-ohm load), Adjustable

Note : \*1) The input/output level of a component signal conforms to the **I**B  
**U** N-10 standard.

## 1-6. SELECT SWITCH SETTING

Along with the select switches on the control panel and the connector panel, the switches listed below are on the circuit boards. These switches must be set according to operating conditions.

### DEC-49P Board

#### S201 : NOISE CANCELLER Switch

ON : Noise Canceller ON  
OFF : Noise Canceller OFF

When the unit is shipped, NOISE CANCELLER Switch is set to the ON position.

### ENC-11P Board

#### S1 : C-MUTING Switch

ON : BLACK and WHITE  
OFF : COLOR

When the unit is shipped, the C-MUTING Switch is set to the OFF position.

### CEC-3P Board

#### S1 : C-NOISE CANCELLER Switch

ON : INPUT ON  
OFF : INPUT OFF

When the unit is shipped, C-NOISE CANCELLER Switch is set to the ON position.

### SY-110 Board

#### S1, S2 : VTR ID NO. SELECT Switch

BVW-35P can insert the ID No. to the user bit of the time code. These switches are used to set the ID No.

When the unit is shipped, the VTR ID NO. SELECT Switches are set to "00".

### TC-45P Board

#### S1 : TIME CODE OUT MODE SELECT Switch

ON : GENE  
OFF : AUTO

When S1 is in the ON position, the signal from the time code generator is always at the TC OUT connector.

When S1 is in the OFF position, the time code signal is automatically selected between time code playback and generator time code according to the BVW-35P PB or REC/EE modes.

When the unit is shipped, this switch is set to the OFF position.

### AU-93P Board

#### S2 : AUDIO MIX Switch

When this switch is set to the MIX side, input signal in the CH-1 side and CH-2 is mixed and then recorded in the CH-1.

When the unit is shipped, the AUDIO MIX Switch is set to the CH-1 side/

## 1-7. SUPPLIED ACCESSORIES

Supplied BVW-35P accessories are as follows:

1. Antenna Select Switch x 1
2. Coaxial Cable with IEC-type standard aerial connector x 1
3. Carrying Case x 1
4. Extension Board (EX-150) x 1

## 1-8. OPTIONAL ACCESSORIES

The followings optional accessories are available.

1. AC Power Adaptor — AC-500CE
2. Battery Pack — BP-90 or NP-1
3. Battery Charger — BC-210CE (for BP-90) and BC-1WA (for NP-1)

## SECTION 2

### PERIODIC CHECK AND MAINTENANCE

#### 2-1. SYSTEM CONTROL OPERATION CHECK

It is recommended that the following check is performed daily before the operation. Note that the switches must be set according to the way the unit is used after the check.

##### 2-1-1. Playback Function Check

Equipment : (1) Recorded tape (Video, Audio CH-1/CH-2/CH-3/CH-4, Time code, FM Audio)  
                  (Do not utilize an alignment tape.)

(2) Video and audio monitor

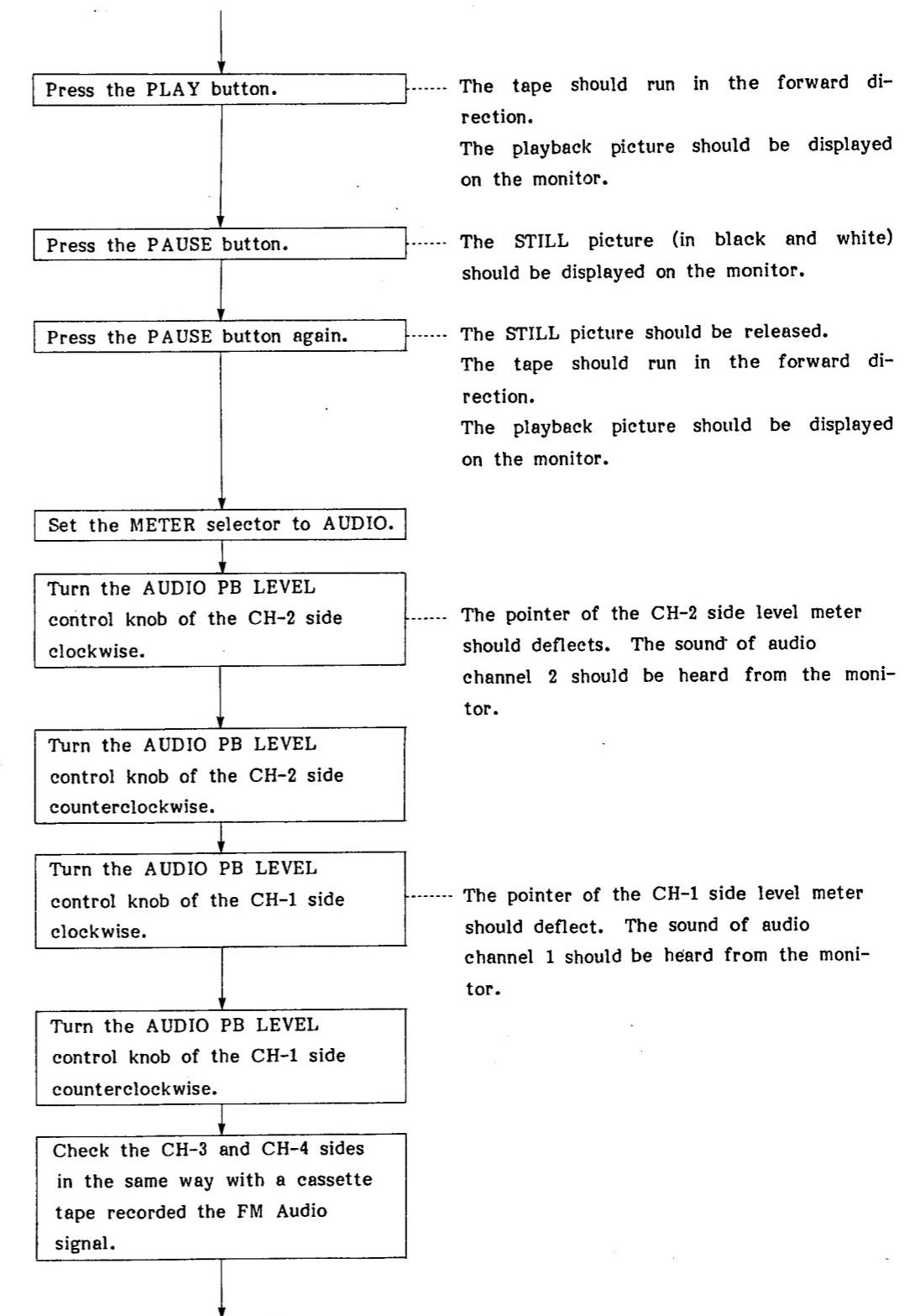
(3) Fully charged battery

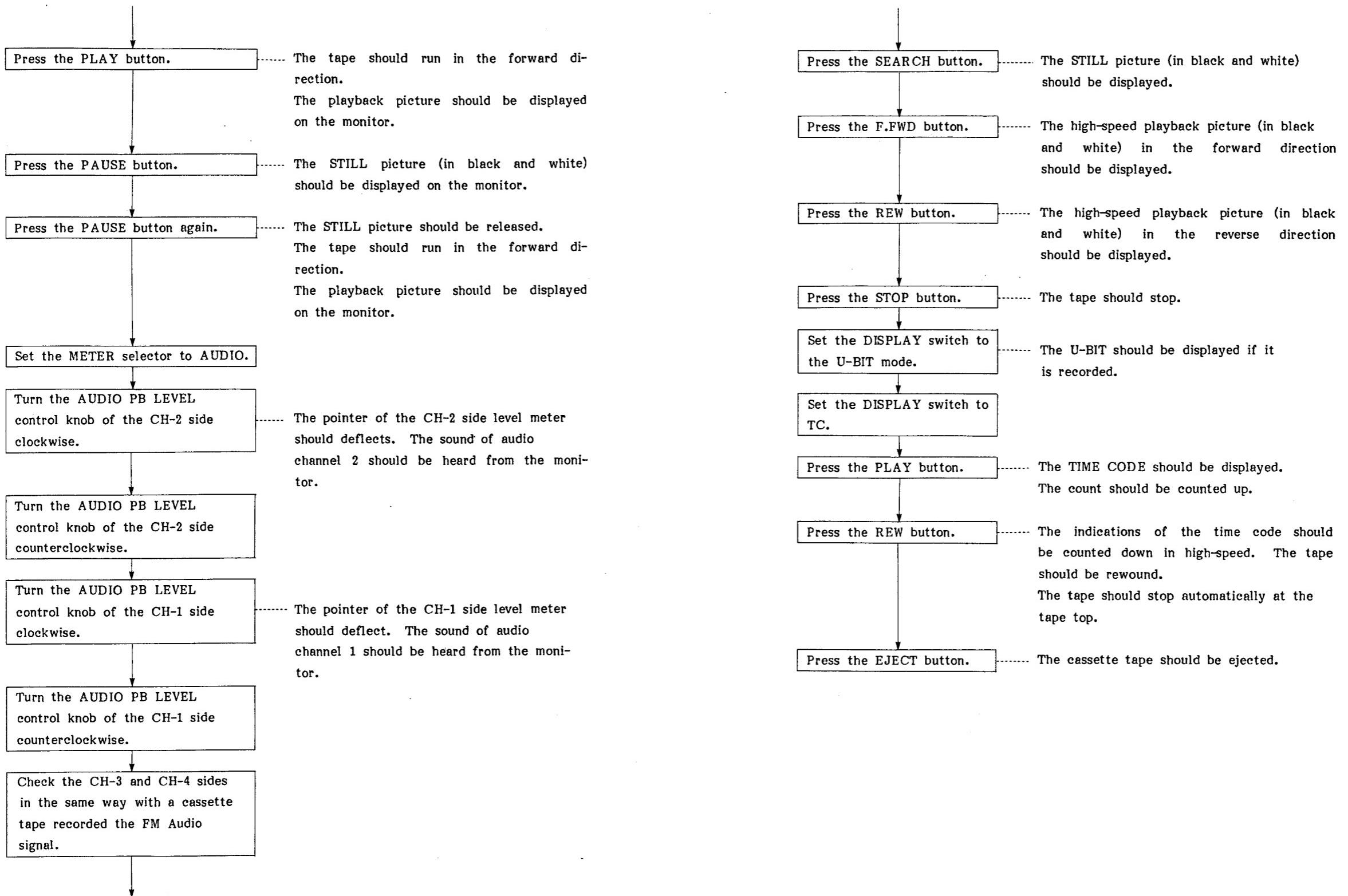
Switch Setting : (1) DISPLAY switch : CTL

(2) MONITOR selector : CH-1 to CH-4; ON

(3) TRACKING control : Clicked position

Operation	Check Point
Insert a fully charged battery.	
Turn the POWER switch ON.	The HUMID lamp should not light.
Press the BATT switch.	The pointer of the rightest level meter should be in the green zone.
Insert a cassette tape.	The tape should be in the threading mode.
Press the F.FWD button.	The tape should be rapidly advanced. The time counter display figure should count up.
Press the STOP button.	The tape should stop.
Press the RESET button.	The figure on the time counter should return "0 00 00".



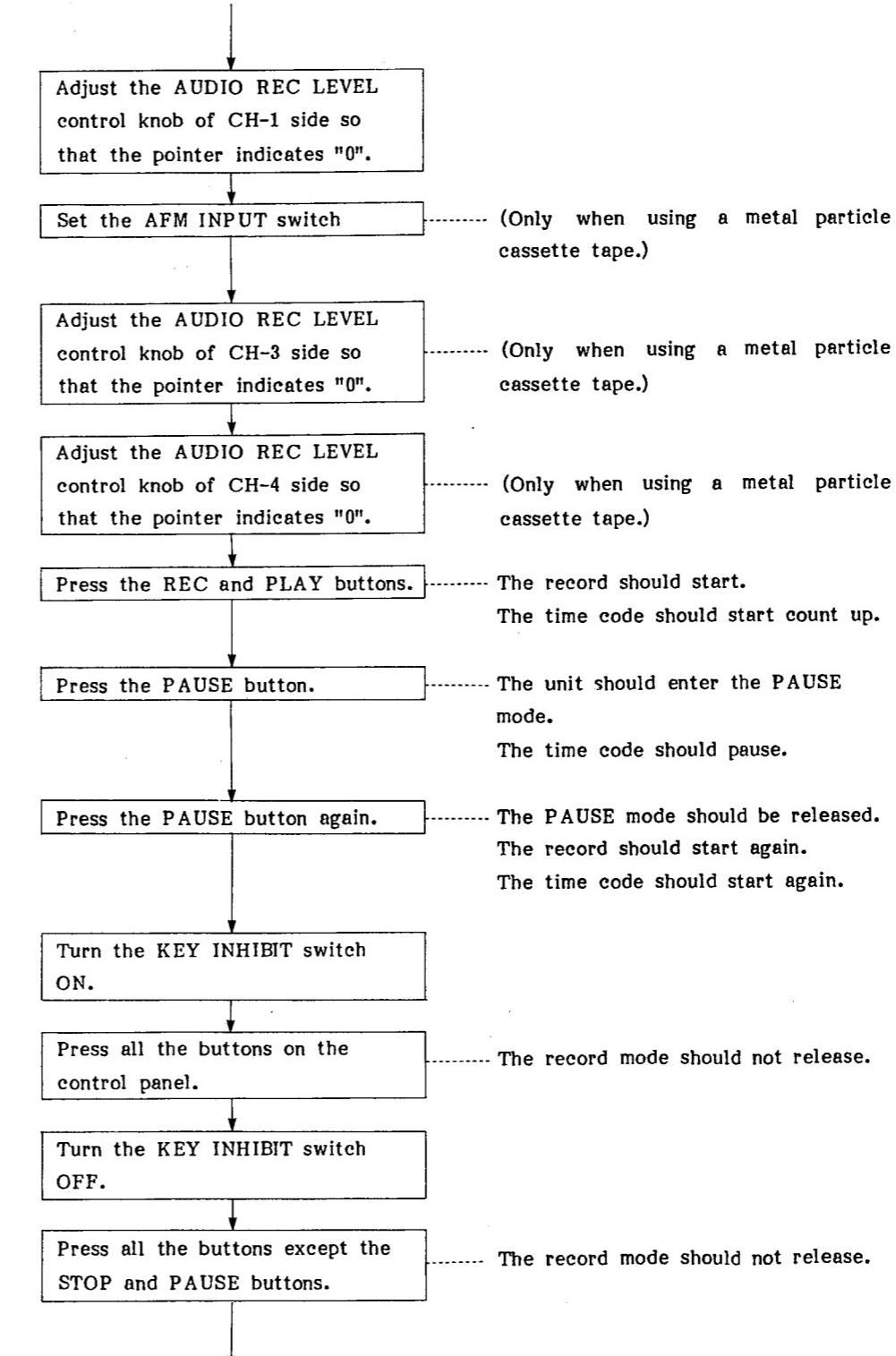
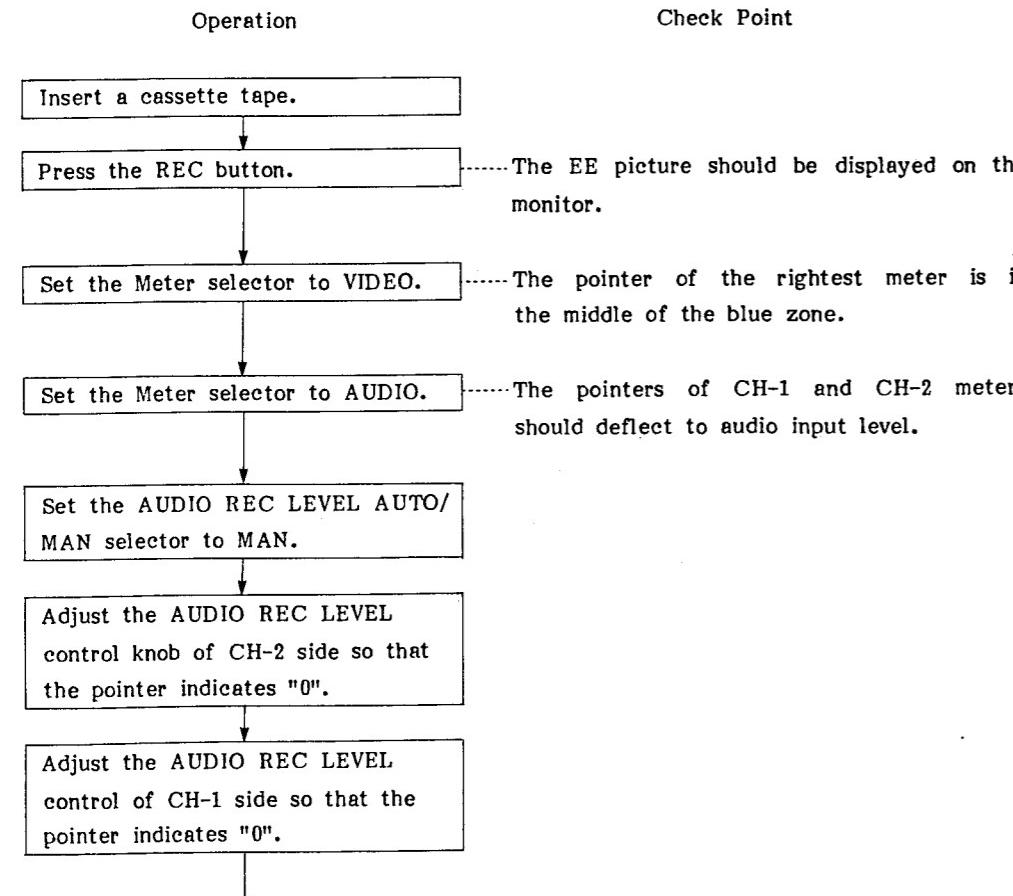


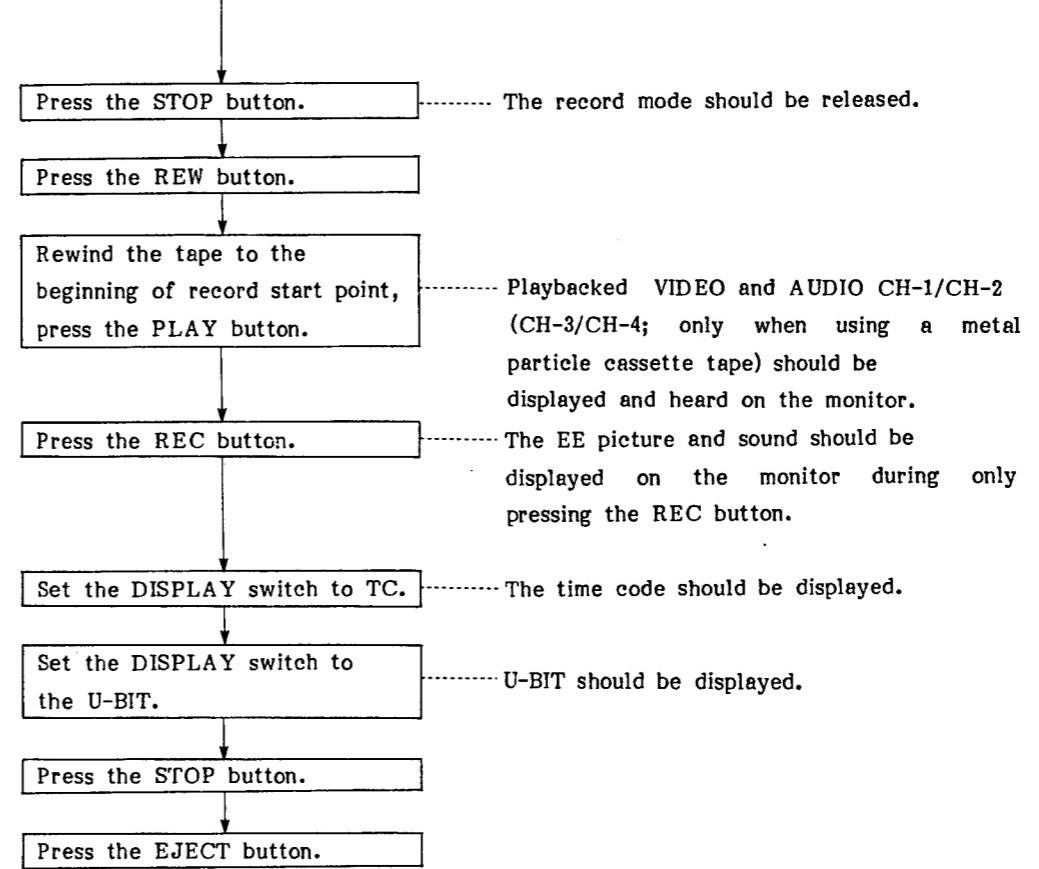
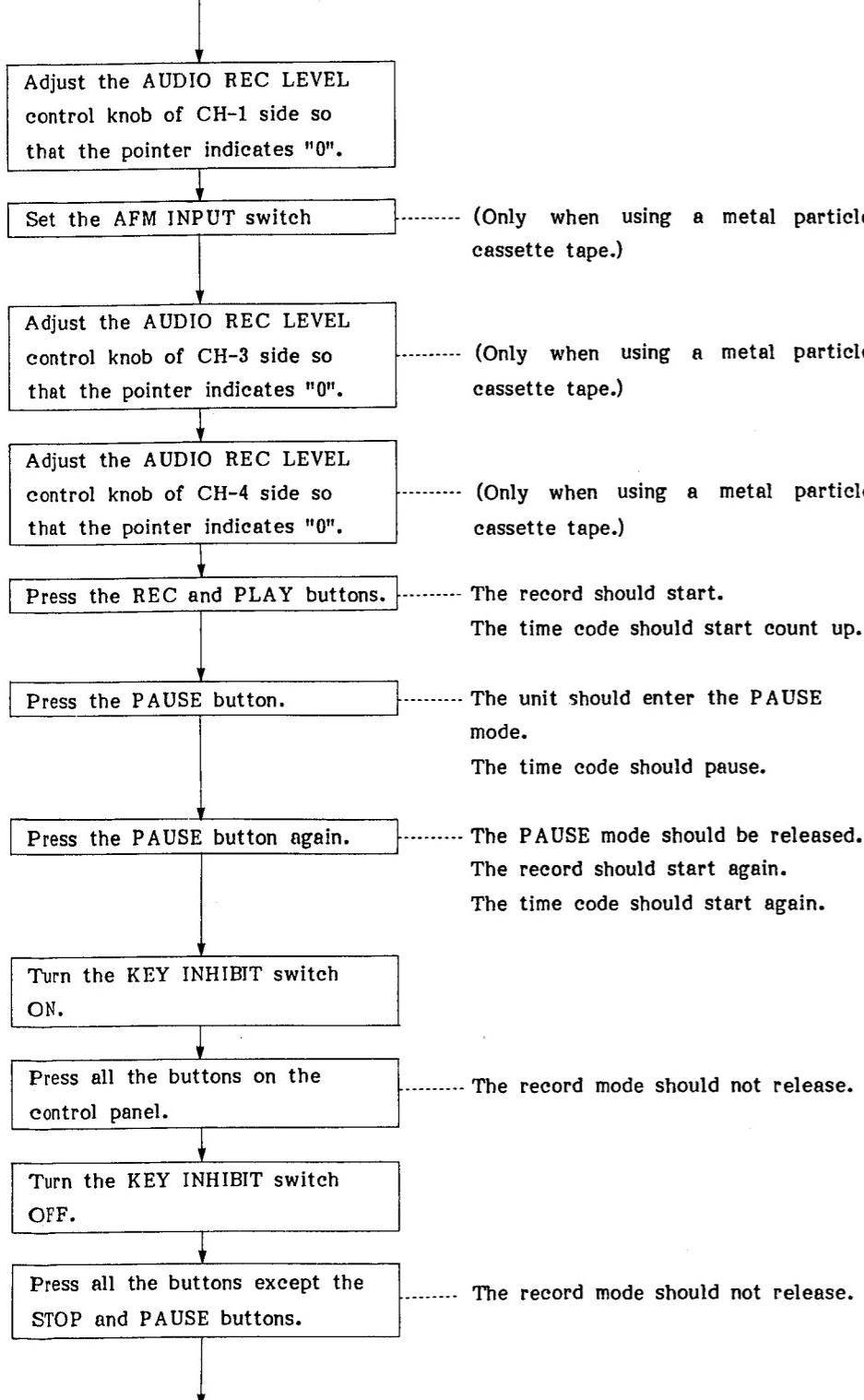
## 2-1-2. REC Function Check in LINE Signal

Perform after the playback function check.

Equipment and setting :  
 (1) Video Tape  
 (2) Connect the video signal to VIDEO IN connector and the audio signal to AUDIO IN connector on the connector panel.

Switch setting :  
 (1) DISPLAY switch : TC  
 (2) MONITOR selector : CH-1 to CH-4; ON  
 (3) AUDIO REC LEVEL AUTO/MAN selector : AUTO  
 (4) AUDIO IN selector : LINE  
 (5) AUDIO IN level selector : Set the input level  
 (6) VIDEO IN selector : LINE  
 (7) F-RUN/R-RUN selector : R-RUN  
 (U-BIT should be set the suitable value.)

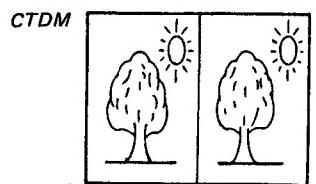
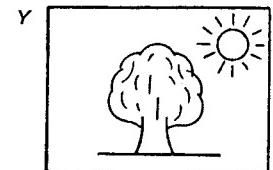
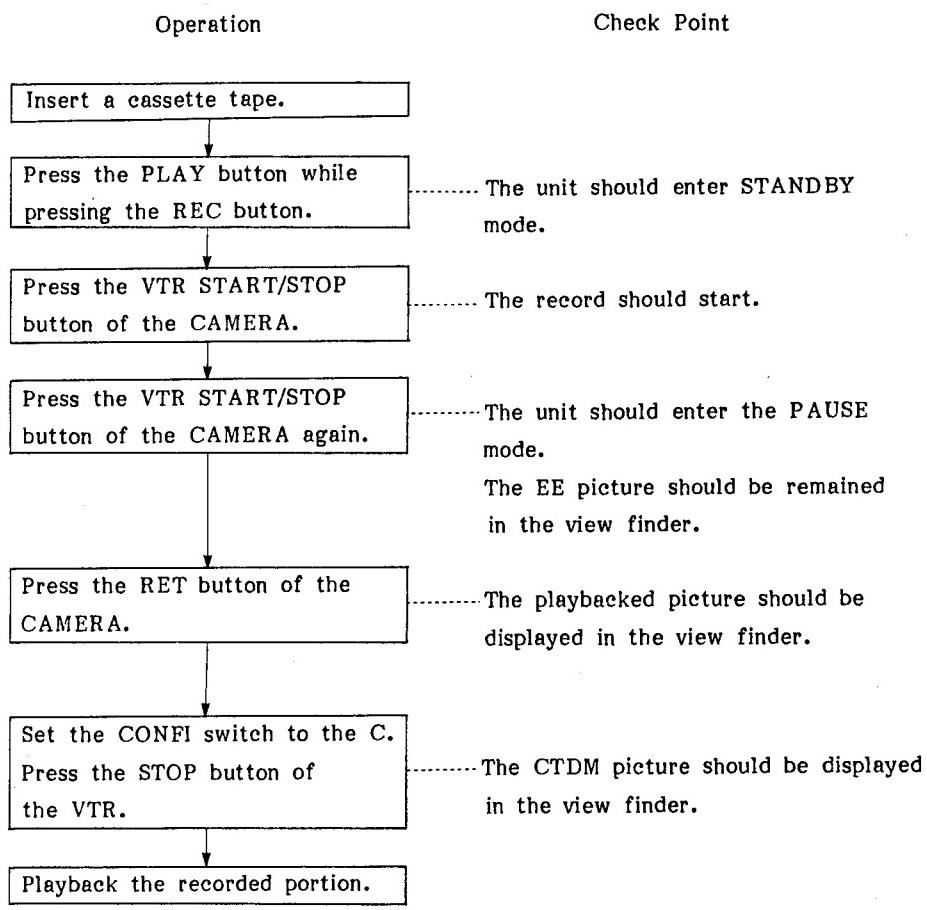




### 2-1-3. Record Function Check in CAMERA Signal

Equipment : (1) Video camera (Connect the 26 P connector.)  
               (2) Video tape  
               (3) Video/audio monitor

Switch setting : (1) DISPLAY switch : CTL  
                   (2) MONITOR selector : CH-1 to CH-4 ON  
                   (3) AUDIO REC LEVEL AUTO/MAN selector : AUTO  
                   (4) AUDIO IN selector : CAMERA  
                   (5) VIDEO IN selector : CAMERA  
                   (6) CONFI switch : Y



R-Y      B-Y

#### 2-1-4. Audio Dubbing Function Check

Equipment and setting : (1) Recorded tape (Do not utilize an alignment tape.)  
(2) Connect the Audio signal to AUDIO IN CH-1 and CH-2.

(3) Video/Audio monitor

Switch setting : (1) DISPLAY switch : CTL  
(2) MONITOR selector : CH-1/CH-2 ; ON  
(3) AUDIO REC LEVEL AUTO/MAN selector : MAN  
(4) AUTO IN selector : LINE  
(5) DUB switch : CH-1 or CH-2

Operation	Check Point
Insert a recorded cassette tape.	
Put the METER selector to AUDIO.	
Press the PLAY and PAUSE buttons.	
Press the AUDIO DUB button.	
Adjust the AUDIO REC LEVEL control of CH-1 or CH-2 side so that the pointer indicates "0". (*1)	----- The sound of EE recorded in CH-1 or CH-2 should be heard.
Press the PAUSE button.	----- The unit should enter the AUDIO/DUB mode.
Press the STOP button.	
Playback dubbing portion of the audio signal.	----- The audio signal should be dubbed to CH-1 or CH-2.
Press the EJECT button.	

Adjust the AUDIO REC LEVEL control of CH-1 or CH-2 side so that the pointer indicates "0". (\*1)

----- The sound of EE recorded in CH-1 or CH-2 should be heard.

----- The unit should enter the AUDIO/DUB mode.

----- The audio signal should be dubbed to CH-1 or CH-2.

\*1

Adjust the AUDIO REC LEVEL of the channel selected with the DUB switch.

When checking the both channels, adjust one by one.

**Checking procedure:**

(a) Turn the PAUSE button ON/OFF. Repeat the AUDIO dubbing in both channel.

or

(b) Change the channel with the DUB switch during the dubbing, and check that the audio is dubbed in both CH-1 and CH-2.

## 2-2. MAINTENANCE

It is recommended that the following periodic check and maintenance schedule be employed in order to obtain maximum performance and longer tape life from the BVW-35P.

○ : Cleaning      ◇ : Check      ♦ : Replacement

Item	Operating Hours (H) Replacement Part No.	500	1000	1500	2000	2500	3000	3500	4000	Remarks
		○	○	○	○	○	○	○	○	
Cleaning of the tape movement area.	_____	○	○	○	○	○	○	○	○	Perform whenever repair work is attempted.
Cleaning or replacement of the threading motor belt.	3-676-303-00	○	○	○	♦	○	○	○	♦	
Cleaning or replacement of the drum belt.	3-719-123-01	○	○	○	♦	○	○	○	♦	
Cleaning or replacement of the pinch roller.	X-3676-031-0	○	○	○	♦	○	○	○	♦	
Cleaning or replacement of the upper drum ass'y.	A-6762-334-A	○	♦	○	♦	○	♦	○	♦	Life of the video heads are affected extensively by operating ambient condition.
Check of the FWD back tension (Replacement of the brake band).	X-3682-811-0	-	◇	-	◇	-	♦	-	◇	

## 2-2-1. Digital Hours Meter

The digital hours meter is located on the connector panel. This hours meter has four display mode. The accumulated elapsed operation time or number of operations will be displayed for every mode. You should periodically inspect the system based on the hours meter.

**Note:** The hours meter has a built-in battery which should be replaced every five years.

### 1. Display mode

#### (1) T1 : OPERATION METER mode

Displays accumulated time that the unit has been turned ON.

#### (2) T2 : DRUM RUNNING METER mode

Displays accumulated rotation time of the drum in the THREADING END mode (except the SAVE mode).

#### (3) T3 : TAPE RUNNING METER mode

Displays accumulated tape running time in the F.FWD, REW, PLAY, SEARCH, REC mode (but not the STILL mode.)

#### (4) CT : THREADING/UNTHREADING COUNTER mode

Displays accumulated number of threading and unthreading operations.

#### • T1, T2, and T3

These mode display the accumulated time. The actual operation time is equal to the displayed value multiplied by 10.

(Example) (illust)

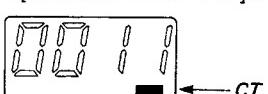


This display indicates 110 hours 00 minutes 00 seconds to 119 hours 59 minutes 59 seconds (up to a maximum of 99999 hours 59 minutes 59 seconds can be displayed.)

#### • CT

This mode displays the number of operations instead of the time. The actual number of operations used is equal to the displayed value multiplied by 10.

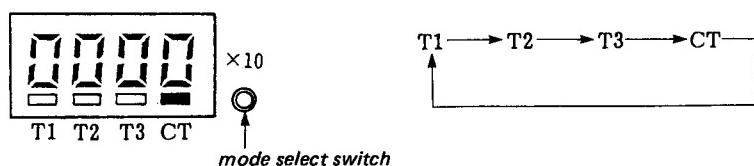
(Example)



This display indicates between 110 and 119 operations.

## 2. Mode selection

When the mode select switch is pressed, the display rotates in the sequence shown below.



When the mode is set, the mode display bar in the designated mode lights or blinks. The VTR operation status at that time is described below.

Mode	Lights	Flashes
T1	<ul style="list-style-type: none"><li>When the power is turned off.</li></ul>	<ul style="list-style-type: none"><li>When the power is turned on.</li></ul>
T2	<ul style="list-style-type: none"><li>When the power is turned off.</li><li>When the power is turned on in a mode other than THREADING END mode.</li></ul>	<ul style="list-style-type: none"><li>When the drum is rotating in the THREADING END mode.</li></ul>
T3	<ul style="list-style-type: none"><li>When the power is turned off.</li><li>When the power is turned on in a mode other than FF, REW, PLAY, or SEARCH mode.</li></ul>	<ul style="list-style-type: none"><li>When the tape is running in the FF, REW, PLAY, or SEARCH mode.</li></ul>
CT	_____	<ul style="list-style-type: none"><li>When the power is turned on or off.</li></ul>

### 2-3. MAINTENANCE AFTER REPAIRS

Perform the following maintenance after repairs regardless of the unit operating hours.

1. Video heads and stationary heads cleaning.  
(Refer to Section 2-4-1 to 2-4-3.)
2. Tape movement area cleaning.  
(Refer to Section 2-4-4.)

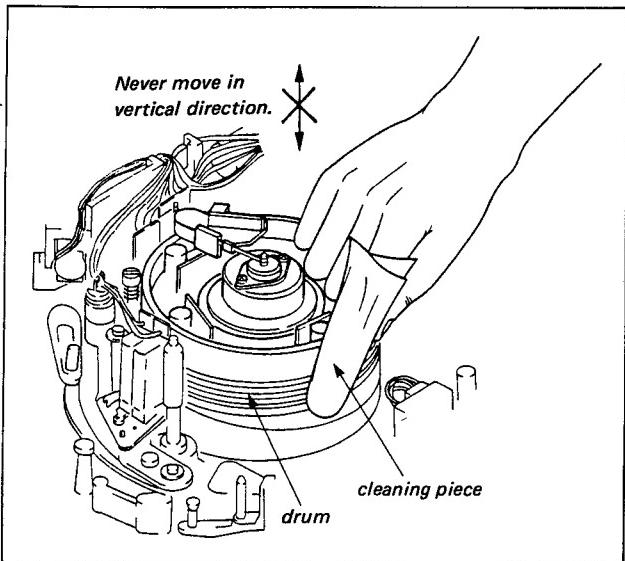
### 2-4. CLEANING PROCEDURE

Perform the cleaning as the following procedure. After the cleaning, insert a cassette tape after the cleaning fluid evaporate completely.

#### 2-4-1. Video Head

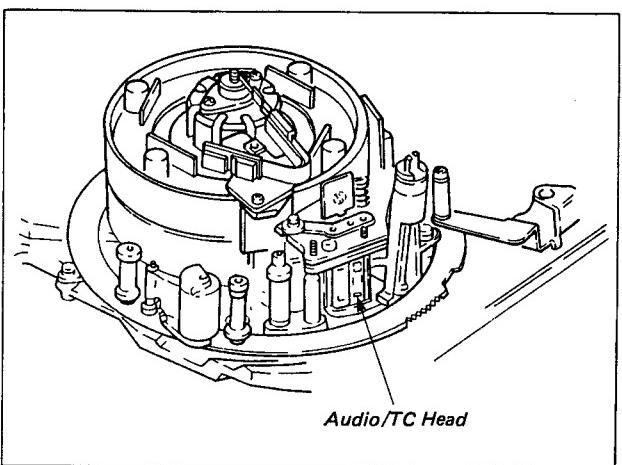
While pressing the cleaning piece moistened with cleaning fluid lightly, and turn the drum slowly by hand.

- Note :**
1. Never move the cleaning piece in the vertical direction of the head tip in cleaning.
  2. Perform the cleaning in the power OFF mode.



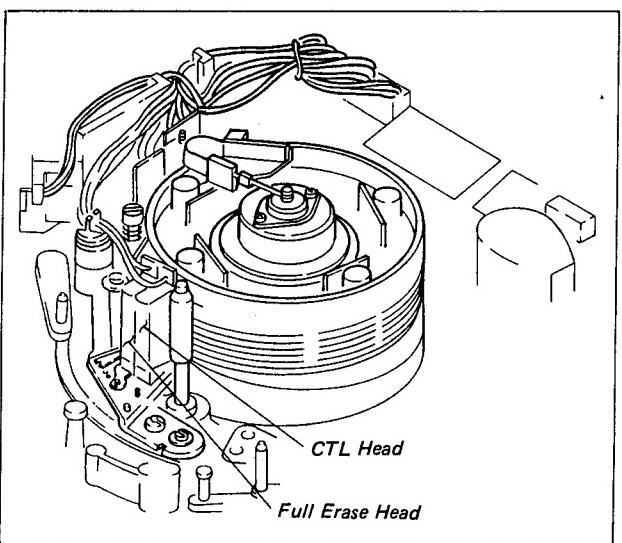
#### 2-4-2. Audio/TC Head

Clean with the cleaning piece moistened with cleaning fluid.



#### 2-4-3. CTL/Full Erase Head

Clean with the cleaning piece moistened with cleaning fluid.

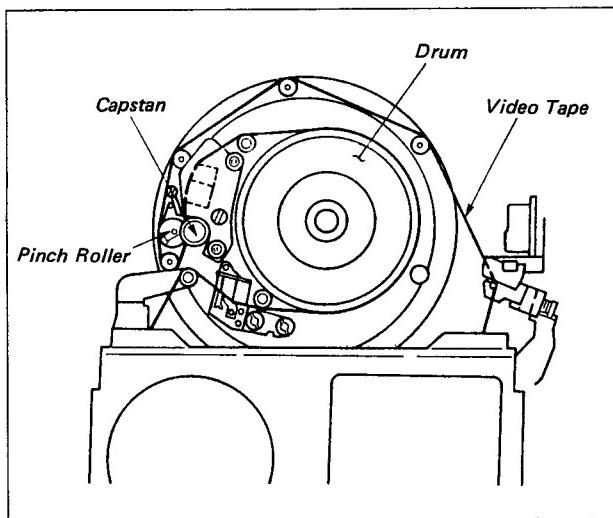


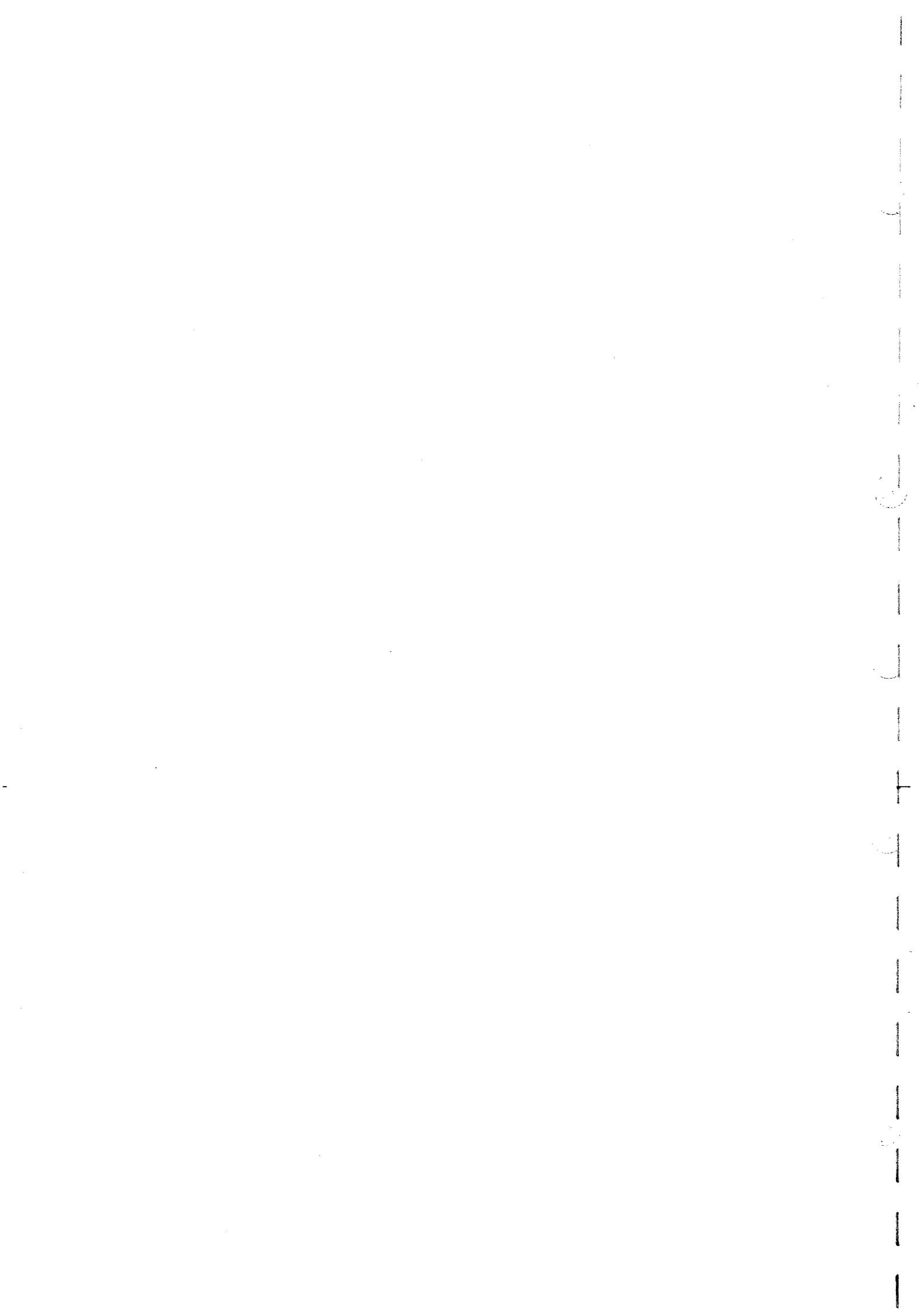
#### 2-4-4. Tape Movement Areas

Wipe the tape bearing surface as shown in the following figure (of the tape guides, drum, capstan and the pinch roller) with a piece of cleaning piece moistened with cleaning fluid.

**Note :** Do not clean the surface of the condensation sensor on the slant chassis with cleaning cloth moistened with the cleaning fluid.

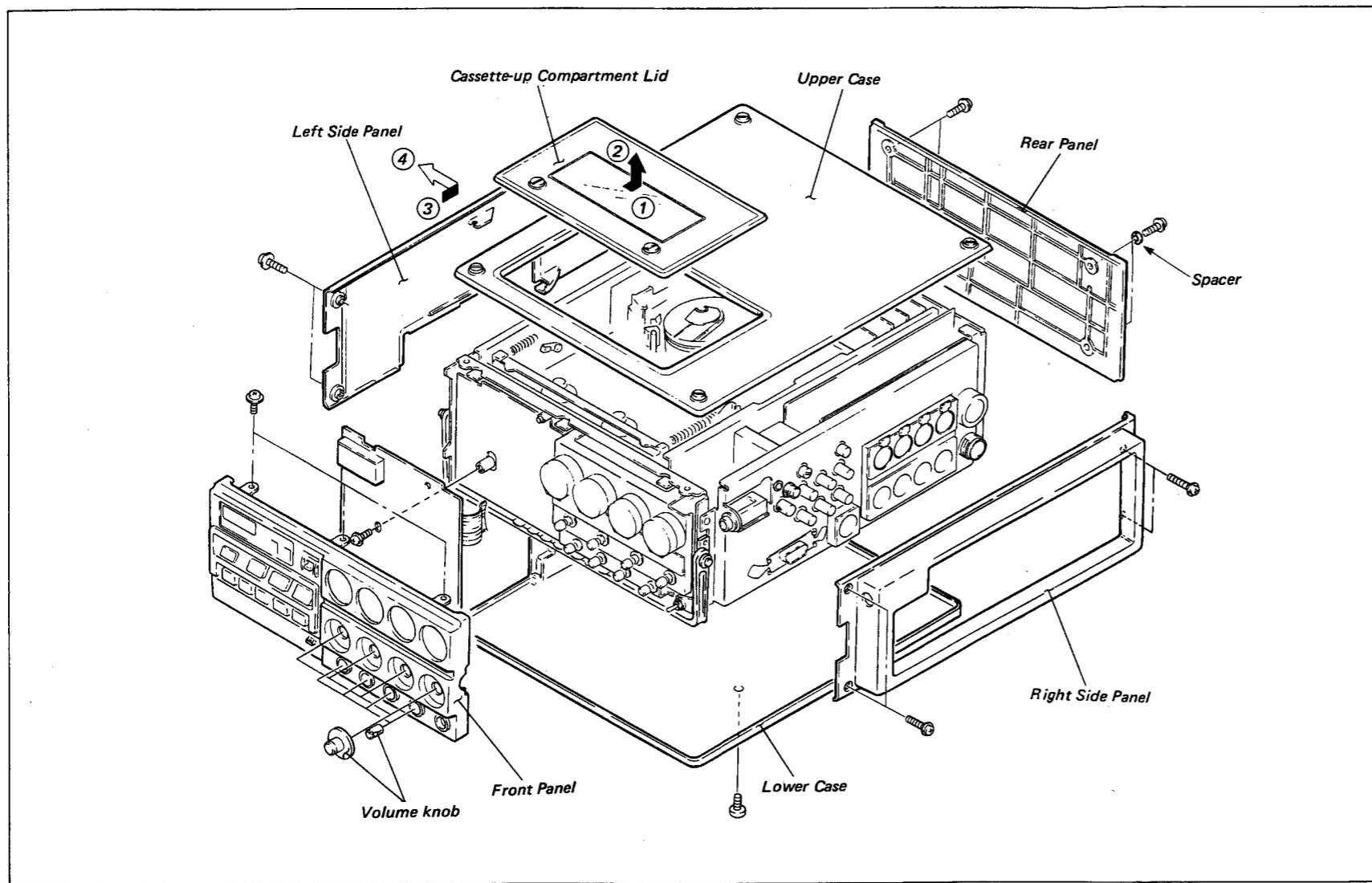
Clean the surface with dry cloth.





## SECTION 3 SERVICE INFORMATION

### 3-1. REMOVAL OF THE CABINET



#### Upper Case

- (1) Loosen the four fixing screws, and remove it.  
(The fixing screws cannot be detached since they uses retainers on the Upper Case.)

#### Cassette-up Compartment Lid

- (1) Loosen the two fixing screws of the Cassette-up Compartment Lid. (The fixing screws cannot be detached since they uses retainers on the Cassette-up Compartment Lid.)
- (2) Move the Cassette-up Compartment Lid in the direction of the arrows ① and ②.

**NOTE :** When installing, move the Cassette-up Compartment Lid in the opposite direction of the arrows ① and ② so that the projection of the Cassette-up Compartment is inserted into the hole of the Lid.

#### Left Side Panel

- (1) Remove the Upper Case and the Lower Case.
- (2) Remove the four fixing screws of the Left Side Panel.
- (3) Remove the Left Side Panel in the direction of the arrows ③ and ④.

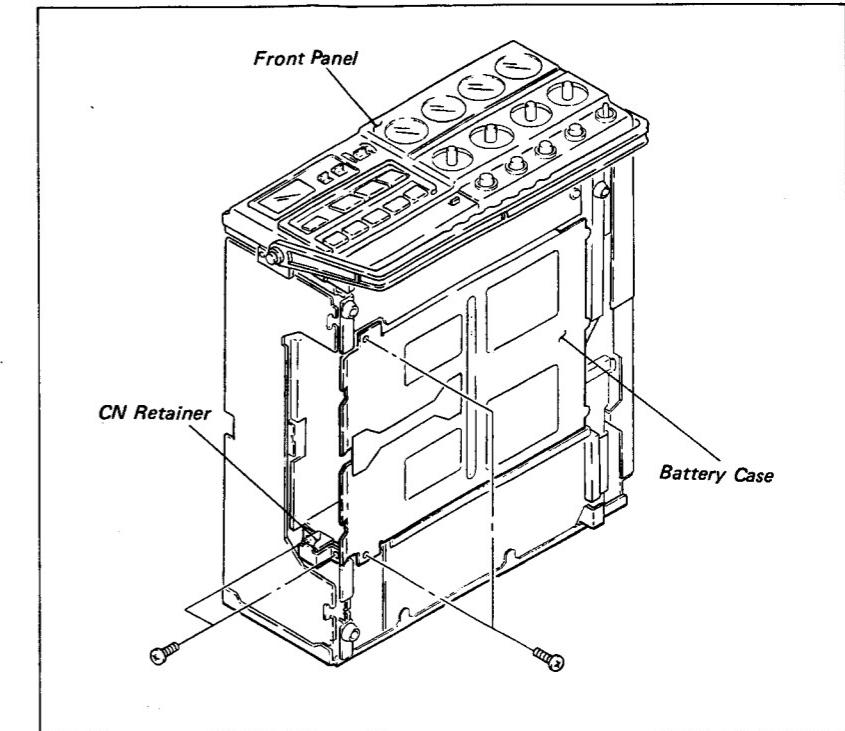
#### Right Side Panel

- (1) Remove the Upper Case.
- (2) Remove the four fixing screws of the Right Side Panel.

#### Rear Panel

- (1) Remove the Upper Case, Left Side Panel and the Lower Case.
- (2) Remove the four fixing screws of the Rear Panel.

**NOTE :** The two spacers are installed to the left of the Rear Panel. Be sure not to lose these spacers.



#### Front Panel

- (1) Remove the Control Knobs and Upper Case.
- (2) Remove the upper side three fixing screws of the Front Panel. (At this time, remove the fixing screw of front below side of the Right Side Panel.)

#### Lower Case

- (1) Remove the four fixing screws of the Lower Case.

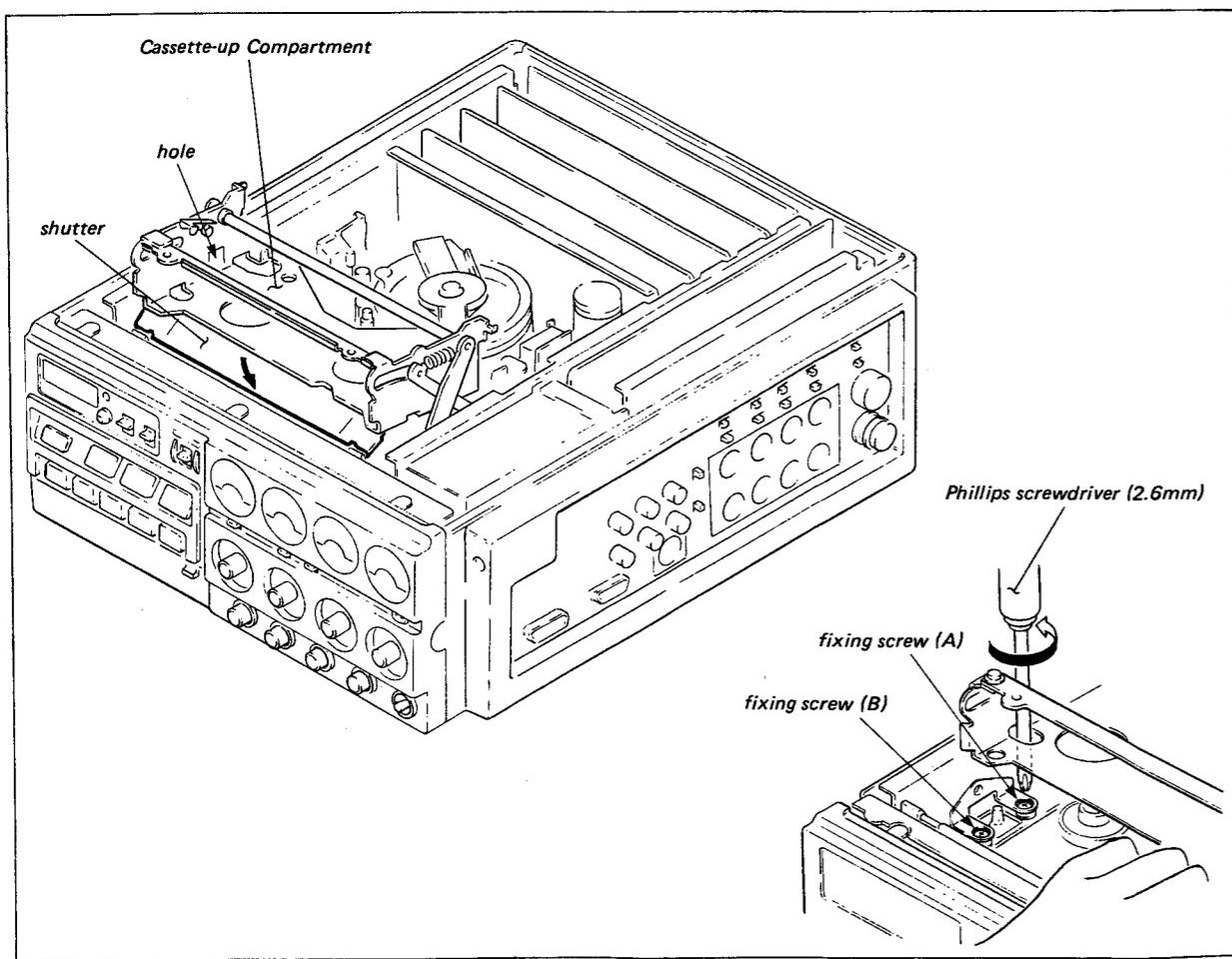
#### Battery Case

- (1) Remove the Lower Case and Left Side Panel.
- (2) Remove the two fixing screws of the CN retainer.
- (3) Remove the two fixing screws of the Battery Case.

**NOTE :** When installing, perform the reverse procedures. Install the lug terminal to ground with the Battery Case.

### 3-2. REMOVAL OF THE CASSETTE-UP COMPARTMENT

- (1) Remove the Cassette-up Compartment Lid. (Refer to Section 3-1.)
- (2) Turn ON the power, push the EJECT button, and put the Cassette-up Compartment into the up state.
- (3) Insert a phillips screwdriver (2.6 mm) into the left hole of the Cassette-up Compartment as shown in the figure, and loosen the fixing screw (A) as shown in the detailed view. The fixing screws cannot be detached since they uses retainers on the Cassette-up Compartment.
- (4) Loosen the fixing screw (B) as shown in the detailed view, while pushing the Shutter in the direction of the arrow.
- (5) Loosen the right side fixing screws in the same manner. The Cassette-up Compartment can be removed from the chassis.

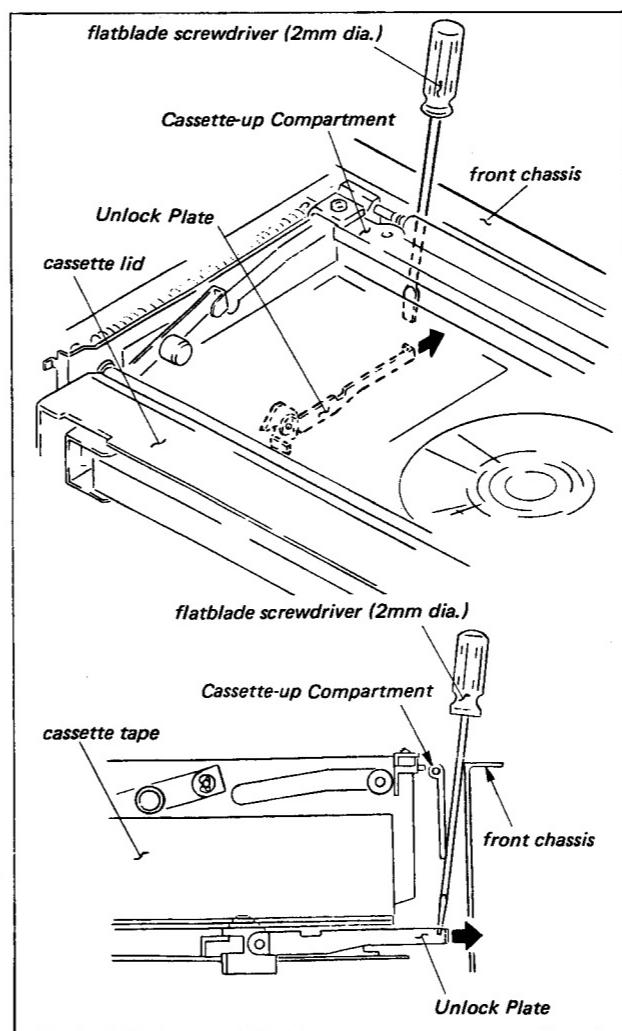


3-3

### 3-3. CANCELLATION OF THE LOCK OF THE CASSETTE-UP COMPARTMENT WITHOUT POWER SUPPLY

Generally, the Cassette-up Compartment is unlocked and is put into the up state by turning the power ON and pushing the EJECT button. However when the power supply is not available, or when the Cassette-up Compartment does not rise up, the Cassette-up Compartment will be put into the up state as following steps.

- (1) Remove the Cassette-up Compartment Lid and Upper Case. (Refer to Section 3-1.)
- (2) Insert a flatblade screwdriver (2 mm dia.) between the front chassis and the Cassette-up Compartment, and insert the end of the driver into the notch of the Unlock Plate.



3-4

### 3-4. SPARE PARTS

(1)

The shaded and -marked components are critical to safety.

Replace only with the same components as specified.

- (2) Replacement parts supplied from the Sony Parts Center will sometimes have a different shape and outside view from the parts which are used in the unit. This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".  
This manual's exploded view and electrical spare parts lists indicate the part numbers of "the present standardized genuine parts." Regarding engineering part changes in our engineering department, refer to Sony service bulletins and service manual supplements.
- (3) The parts marked with "s" in the SP column of the exploded views and electrical spare parts list are normally stocked for replacement purposes. The parts marked with "o" in the SP column are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

### 3-5. NOTES WHEN SERVICING

#### . Maintenance of the Printed Circuit Board in the Rotary Upper Drum

The playback pre-amplifier for the video signal, the PA-67 Board are installed on the Rotary Upper Drum.

The dynamic balance of the entire Rotary Upper Drum is perfectly adjusted in the state that the PA-67 Board is installed. Therefore, the PA-67 Board should not be removed from the Rotary Upper Drum nor should the electric parts on the printed board be installed or removed. (Never perform solder to remove or install.) When the PA-67 Board fails, replace the entire Rotary Upper Drum. If the PA-67 Board is removed, the dynamic balance still be out of specification. Jitter will be increase, and the servo will be unstable.

#### . Micro Switch

The micro switches (1-571-064-11) are mounted on the both SW-203 (Metal Miss REC Ass'y) and CS-22 (C Detection SW Ass'y) Boards. These micro switches do not work correctly if they are heated too much. Therefore, be careful of the following in replacement.

Use a 18W soldering iron.

Temperature should be below 300°C.

Solder within 3 seconds.

### **3-6. OPERATION OF THE UNIT WITHOUT INSTALLING A CASSETTE TAPE**

The following procedures are described without installing the Cassette-up Compartment.

#### **1. Threading**

- (1) Turn the power ON.
- (2) Keep pressing down the cassette-in switch until the threading ring stops its rotation.

The unit is put into the threading completion mode.

#### **2. PLAY**

- (1) Press the PLAY button in the threading completion mode. The unit is put into the PLAY mode.

#### **3. F.FWD**

- (1) Press the F.FWD button in the threading completion mode. The unit is put into the F.FWD mode.

#### **4. REW**

- (1) Press the REW button in the threading completion mode. The unit is put into the REW mode.
- (2) When putting the unit into the STOP mode, press the STOP button.

#### **5. SEARCH**

##### **FWD SEARCH**

- (1) Press the F.FWD and SEARCH buttons in the threading completion mode. The unit is put into the FWD SEARCH mode.

##### **REV SEARCH**

- (1) Press the REW and SEARCH buttons into the threading completion mode. The unit is put into the REV SEARCH mode.
- (2) When putting the unit into the STOP mode, press the STOP button.

#### **6. Unthreading**

- (1) Press the EJECT button. The threading ring rotates in the clockwise direction.

### **3-7. CASSETTE TAPE REMOVAL PROCEDURE WHEN TAPE SLACK IS ACTIVATED AND WHEN NORMAL EJECTION IS NOT POSSIBLE**

Tape slack in the REC, F.FWD or playback mode is detected with the reel rotation detector of the take-up reel table. If the take-up reel table rotation is stopped more than about 150 msec. by any reason in the REC or playback mode, the unit detects the tape slack. The unit stops all mode work to avoid tape damage. If the take-up reel table rotation is stopped more than about 600 msec. in the UNTHREADING mode, the unit detects the tape slack in the REC and playback mode. The unit stops all mode work.

If the take-up reel table rotation is stopped more than about 600 msec. in the FWD SEARCH mode (only more than  $x1/4$  speed), the unit detects the tape slack. The unit stops all mode work.

In this case, the cassette tape can be removed from the unit by the following procedures. Locate the cause of the trouble and remedy the problem.

#### **When the tape slack is detected.**

The case of the cause of tape slack is in the take-up reel table.

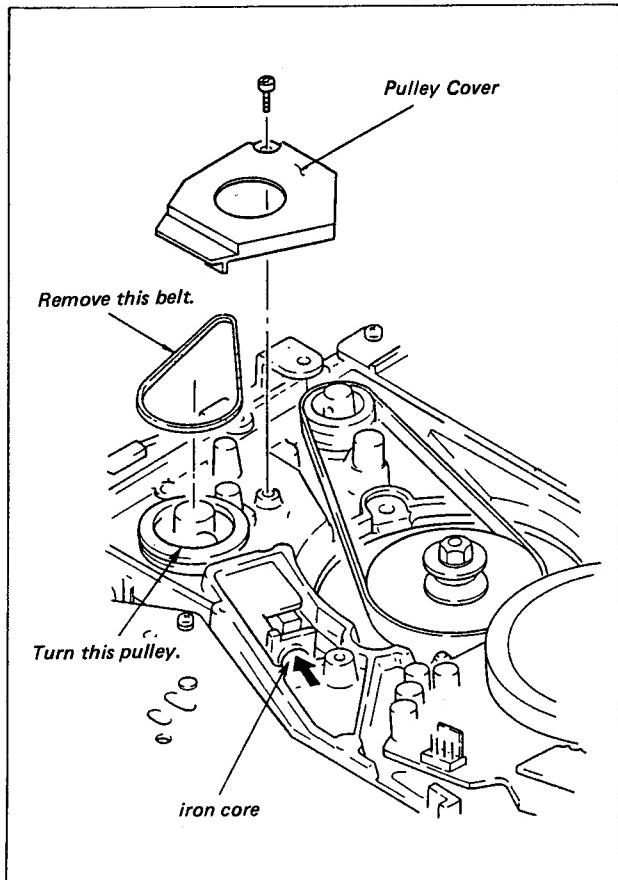
- (1) Turn the power OFF.
- (2) Remove the Upper Case. (Refer to Section 3-1.)
- (3) Turn the power ON once. Check as soon as possible that the Threading Ring rotates in the unthreading direction (clockwise direction) and the tape is taken up to the take-up reel table at the same time. If it is not to meets the both conditions, turn the power OFF quickly.
  - (i) When the Threading Ring does not rotate in the unthreading direction, perform the tape removal procedures (1) to (7).
  - (ii) When the Threading Ring rotates in the unthreading direction but the tape is not taken up to the take-up reel table, perform the tape removal procedures (6) and (7).

The case of the cause of tape slack is not in the take-up reel table.

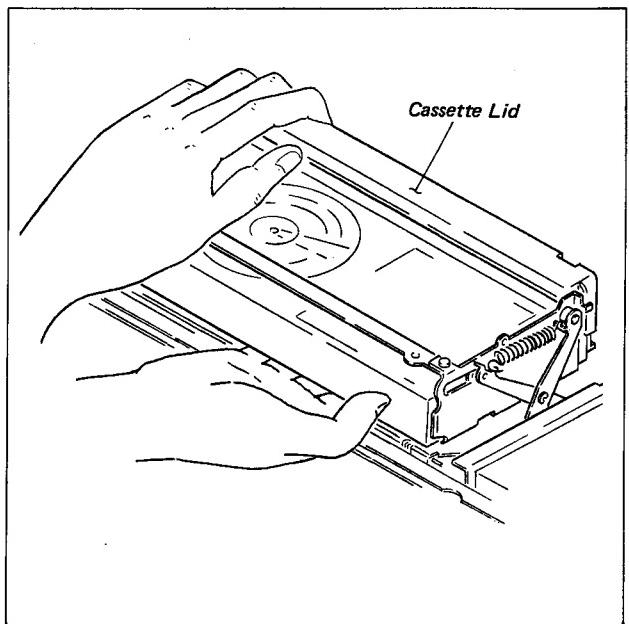
- (1) Press the EJECT button many times.

**Tape removal procedure:**

- (1) Remove the Lower Case, Upper Case and Cassette-up Compartment Lid.  
(Refer to Section 3-1.)
- (2) Remove the two fixing screws, remove the Battery Case and connector.
- (3) Remove the Pulley Cover and the belt as shown in the figure.
- (4) Turn the pulley 3 to 4 turns in the clockwise direction viewing from back side of the unit, while pushing the core of the solenoid as shown in the figure in the direction of the arrow by hand.
- (5) Release the finger from the core, and turn the pulley in the clockwise direction until the threading ring comes in the fully unthreading position.
- (6) While holding down the Cassette-up Compartment Lid by hand, cancel the lock of the Cassette-up Compartment as Section 3-3.



- (7) Hold the Cassette Lid so that it does not close, and rise up the Cassette-up Compartment slowly. Insert a hand under the Cassette-up Compartment, and turn the Reel to rewind the loose tape.
- (8) Close the Cassette Lid, and remove the cassette tape.



### 3-8. TAPE PROTECTION

The VTR has various detection circuits for tape protection. These detection circuits are described here for each mode.

#### (1) During threading

When the VTR is put into the following states during the threading mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the threading operation stops.

- When the threading end switch does not turn ON after 10 seconds from the driving current flows to the threading motor.
- When the unthreading end switch does not turn OFF after 10 seconds from the driving current flows to the threading motor.
- When the drum rotation stops during the threading mode and does not generate the DRUM ROTATE signal.

#### (2) During F.FWD/FWD-SEARCH

When the VTR is put into the following states during the F.FWD or FWD-SEARCH mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the F.FWD or FWD-SEARCH mode operation stops.

- When the take-up reel table rotation stops.
- When the drum rotation stops and does not generate the DRUM ROTATE signal.

#### (3) During REW/REV-SEARCH

When the VTR is put into the following states during the REW or REV-SEARCH mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the REW or REV-SEARCH mode operation stops.

- When the supply reel table rotation stops.
- When the drum rotation stops and does not generate the DRUM ROTATE signal.

#### (4) During PLAY

When the VTR is put into the following states during the PLAY mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the PLAY mode operation stops.

- When the take-up reel table rotation stops.
- When the drum rotation stops and does not generate the DRUM ROTATE signal.
- When the capstan rotation stops and does not generate the CAPSTAN ROTATE signal.

#### (5) During STOP-STANDBY ON

When the VTR is put into the following states during the STOP-STANDBY ON mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the STOP-STANDBY ON mode operation stops.

- When the drum rotation stops and does not generate the DRUM ROTATE signal.
- When the capstan rotation stops and does not generate the CAPSTAN ROTATE signal.

#### (6) During PLAY-PAUSE

- When the drum rotation stops and does not generate the DRUM ROTATE signals.

#### (7) During REC-PAUSE (Except the SAVE mode)

When the VTR is put into the following states during the REC-PAUSE mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the REC-PAUSE operation stops.

- When the drum rotation stops and does not generate the DRUM ROTATE signal.

#### (8) During unthreading

When the VTR is put into the following states during the unthreading mode, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the unthreading mode operation stops.

- When the take-up reel table rotation stops.
- When the UNTHREAD END SW does not turn ON after 10 seconds from the driving current flows to the unthreading motor.

- (9) When mode change from each mode to STOP mode.

When the VTR is put into the mode change from each mode to STOP mode, the tape reverses. Then when the VTR is put into the following states, the protection circuit detects tape slack if it occurs.

The SLACK LAMP lights and the tape reverse operation stops.

- When the REVERSE STATUS signal of the capstan does not generate.

- (10) When the POWER switch turns ON. (Except tape end state in the threading completion mode.)

When the POWER switch turns ON, the VTR is put into the following state. The protection circuit detects tape slack if it occurs.

The SLACK LAMP lights, and the mode change operation to the STOP mode stops.

- When the drum does not rotate and does not generate the DRUM ROTATE signal.
- When the REVERSE STATUS signal of the capstan does not generate.
- When the tension regulator switch does not turn ON.

### 3-9. TROUBLE JUDGEMENT FUNCTION

BVW-35P provides the following trouble judgement function.

TROUBLE CAUSE	BATT LCD	SLACK LCD	HUMID LCD
DRUM ROTATE signal does not generate.	○		
CAPSTAN ROTATE signal does not generate.		○	
TEN REG SW does not turn ON.	○	○	
TEN REG SW does not turn OFF.	○	○	
T-FG/S-FG pulse do not generate.			○
CAPSTAN REV STATUS signal does not supply.	○		○
Does not put into THREAD END.		○	○
Does not put into UNTHREAD END.		○	○
CASSETTE LOCK SW does not turn ON in the EJECT mode.	○	○	○

- (1) The cause and mode of SLACK are displayed on the LEDs on the Front Panel as follows;

When the SLACK occurs, press the STOP button after trouble occurs.

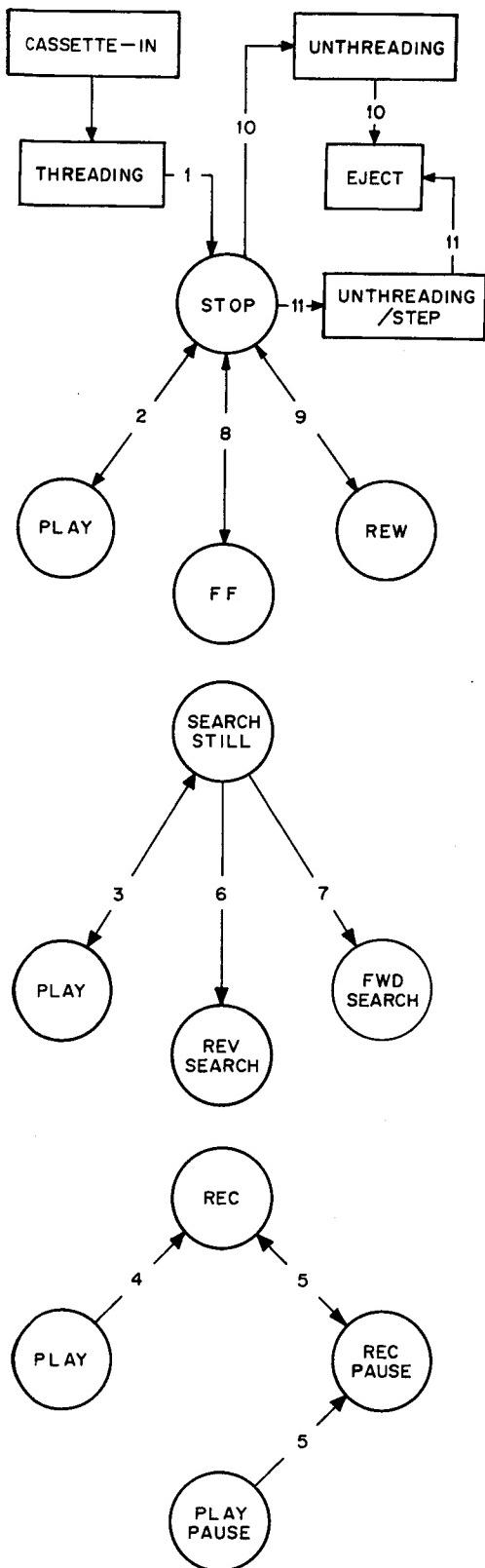
MODE	PLAY LED	REC LED	DUB LED	FF LED	REW LED	SEARCH LED	PAUSE LED	EJECT LED
PLAY	○	—	—	—	—	—	—	—
DUB PLAY	○	—	○	—	—	—	—	—
REC PLAY	○	○	—	—	—	—	—	—
FF	—	—	—	○	—	—	—	—
REW	—	—	—	—	○	—	—	—
FWD SEARCH	—	—	—	○	—	○	—	—
REV SEARCH	—	—	—	—	○	○	—	—
PLAY PAUSE	○	—	—	—	—	—	○	—
DUB PAUSE	○	—	○	—	—	—	○	—
REC PAUSE	○	○	—	—	—	—	○	—
FWD SEARCH PAUSE	—	—	—	○	—	○	○	—
REV SEARCH PAUSE	—	—	—	—	○	○	○	—
STILL	—	—	—	—	—	○	—	—
STOP	—	—	—	—	—	—	—	—
EJECT	—	—	—	—	—	—	—	○

**3-10. FIXTURE**

Part Number	Description	For Use
J-6001-820-A	Drum Eccentricity Gauge (3)	Upper drum eccentricity adjustment
J-6001-830-A	Drum Eccentricity Gauge (2)	
J-6001-840-A	Drum Eccentricity Gauge (1)	
J-6087-000-A	Drum Eccentricity Gauge (5)	
J-6031-840-A	Multi Connector Cable	Video system alignment
J-6080-008-A	Cassette Reference Plate	Reel table adjustment
J-6080-013-A	Dihedral Adjustment Screw	Video head dihedral adjustment
J-6080-029-A	Small Mirror for Adjustment	Video tracking adjustment
J-6080-030-A	Spare Mirror	
J-6152-450-A	Wire Clearance Gauge	Clearance check
J-6190-800-A	Tension Regulator Slantness Check Tool	Tension regulator slantness adjustment
J-6331-120-A	PB Amplifier Tool	Video tracking, CTL head, switching position alignments
Pending	VISC Doubler (EW224)	Video system alignment
Y-2031-001-0	Cleaning Fluid	Cleaning
2-034-697-00	Cleaning Piece	
3-702-390-01	Eccentricity Driver (4 mm dia.)	TC head position adjustment
7-732-050-20	Tension Scale (50g full scale)	Back tension adjustment
8-960-096-51	Alignment Tape, CR-2-1B PS	Video tracking tape for recorder
8-960-096-86	Alignment Tape, CR8-1B PS	Audio system alignment (metal tape)
8-960-096-91	Alignment Tape, CR5-1B PS	Video and audio AFM system alignment (metal tape)
8-960-098-02	Alignment Tape, CR2-1PS	Video tracking tape for player
96-0098-44	Alignment Tape, CR5-2A PS	Video and servo alignments (oxide tape)
96-0098-45	Alignment Tape, CR8-1A PS	Audio and servo alignments (oxide tape)
9-911-053-00	Thickness gauge	Clearance check
Standard Products	Head Demagnetizer (HE-4)	Head demagnetize

### 3-11. TIMING CHART

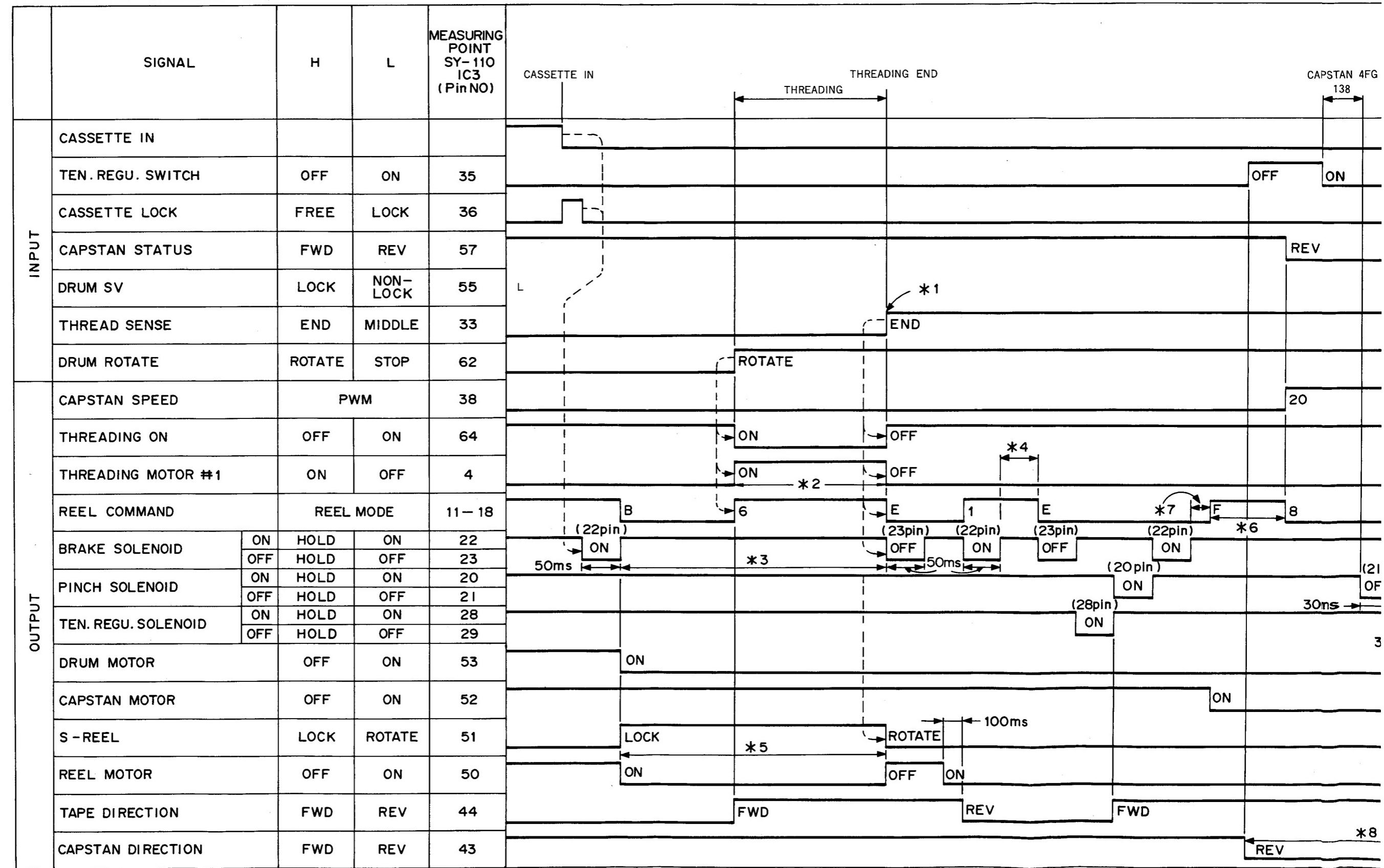
#### TRANSITION OF MODE

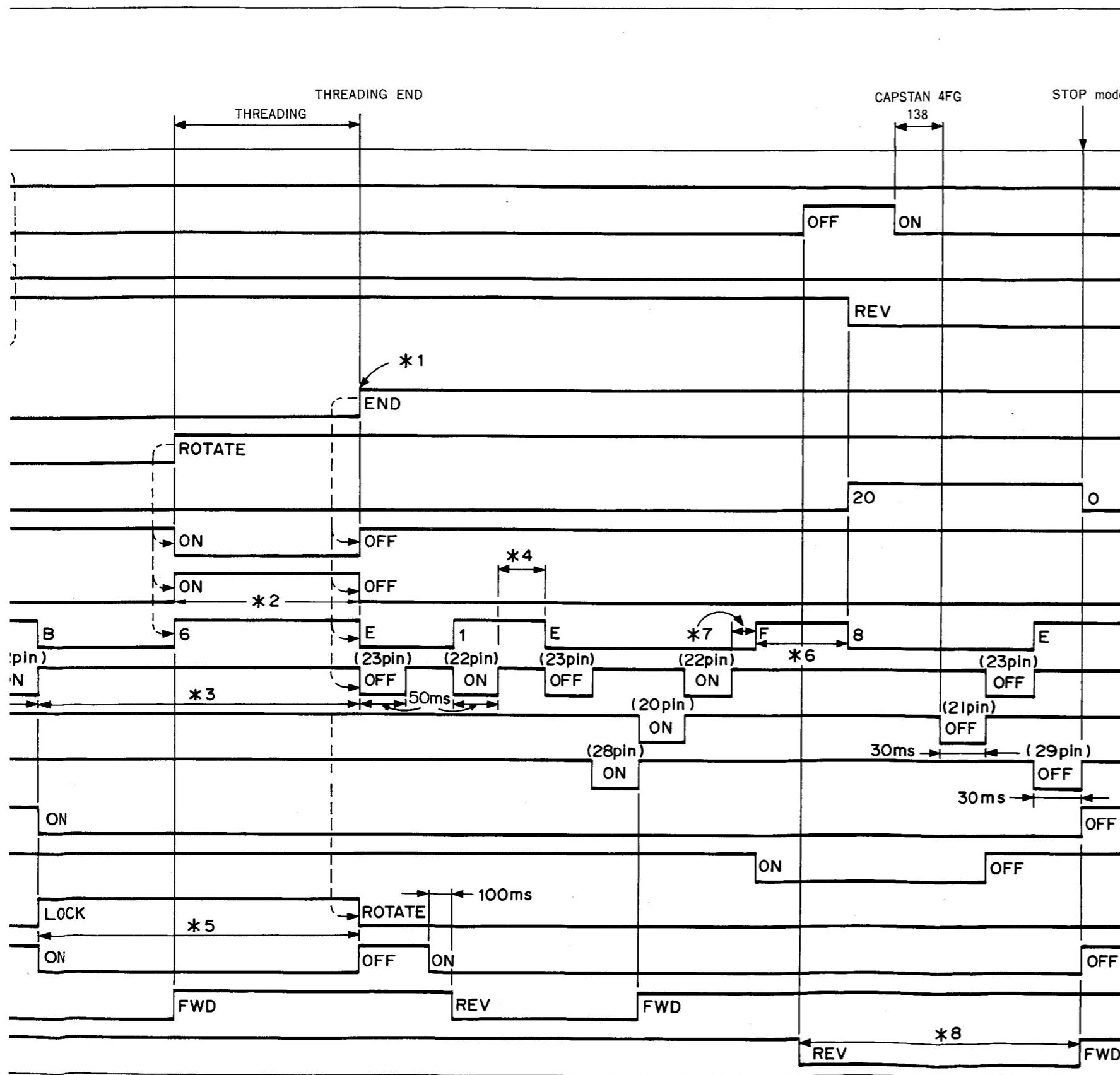


REEL COMMAND MODE TABLE

Mode	Command				Operation	Supply Reel	Take-Up Reel	Remarks
	A	B	C	D				
0	0	0	0	0	FF	Sending out the constant current by SFG.	↻	TFG+SFG =constant SPEED SERVO
1	1	0	0	0	REW	↪	↪	TFG+SFG =constant SPEED SERVO
2	0	1	0	0	FWD SEARCH	Back tension by SFG.	↻	Constant-tape-speed SERVO by FG .
3	1	1	0	0	REV SEARCH	↪	↪	Constant-tape-speed SERVO by FG
4	0	0	1	0	F/F/ SEARCH → Brake	↪	Free	Constant voltage drive
5	1	0	1	0	REW/ SEARCH → Brake	Free	↪	Constant voltage drive
6	0	1	1	0	THREAD-ING	Motor lock ↻	↪	Constant voltage drive
7	1	1	1	0	UN- THREAD-ING	Motor lock ↻	↪	Constant voltage drive
8	0	0	0	1	CTL in the back space edit.	↪	↪	Constant voltage drive
9	1	0	0	1	Sending out back space edit.	↪	↪	Constant voltage drive
A	0	1	0	1	REW → STOP	↪	↪	Constant voltage drive
B	1	1	0	1	When the cassette UP/DOWN	↪	↪	Constant voltage drive
C	0	0	1	1		—	—	—
D	1	0	1	1		—	—	—
E	0	1	1	1	PAUSE	↪	↪	Constant voltage drive
F	1	1	1	1	FWD	↪	↪	Constant voltage drive

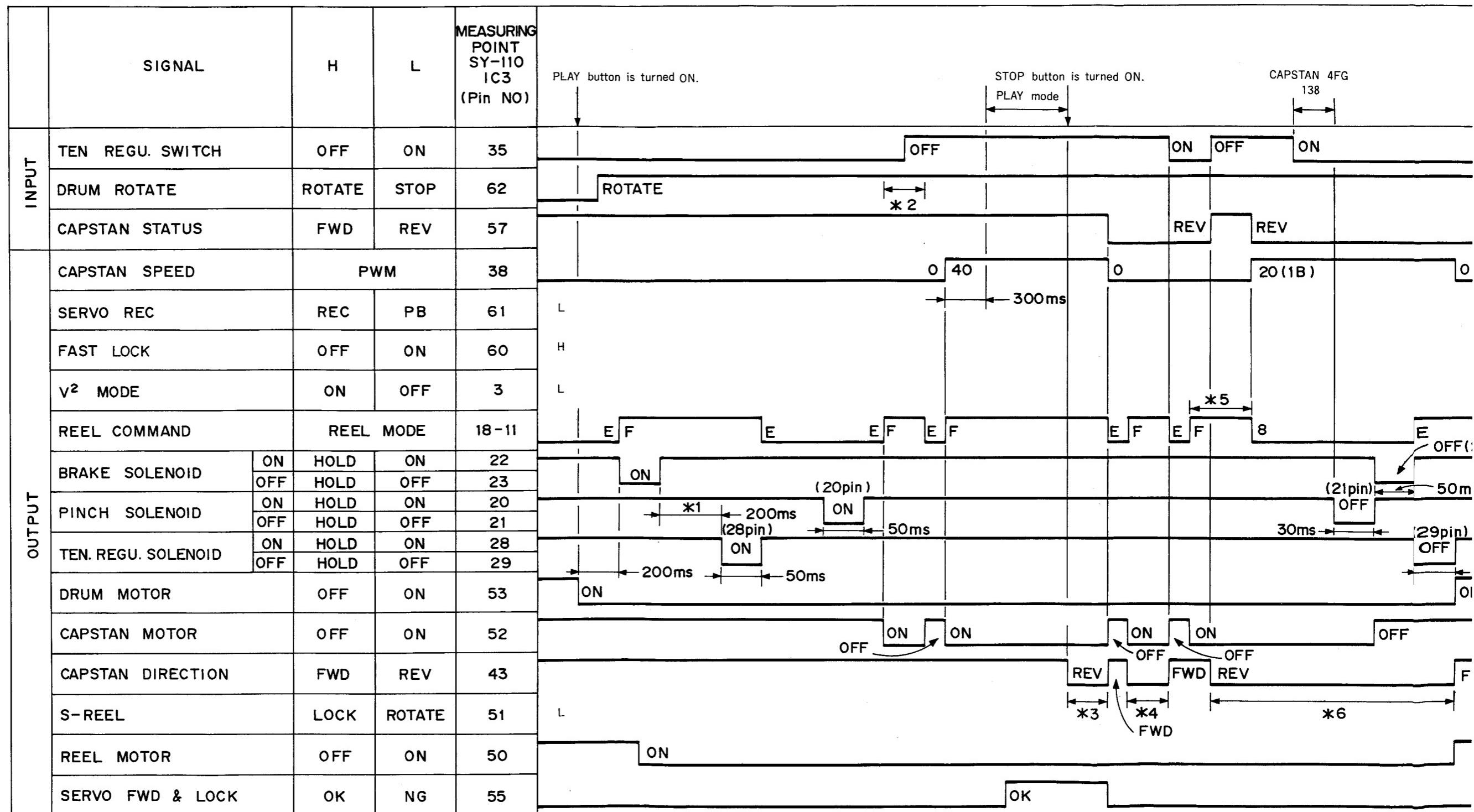
1. CASSETTE IN → THREADING → STOP



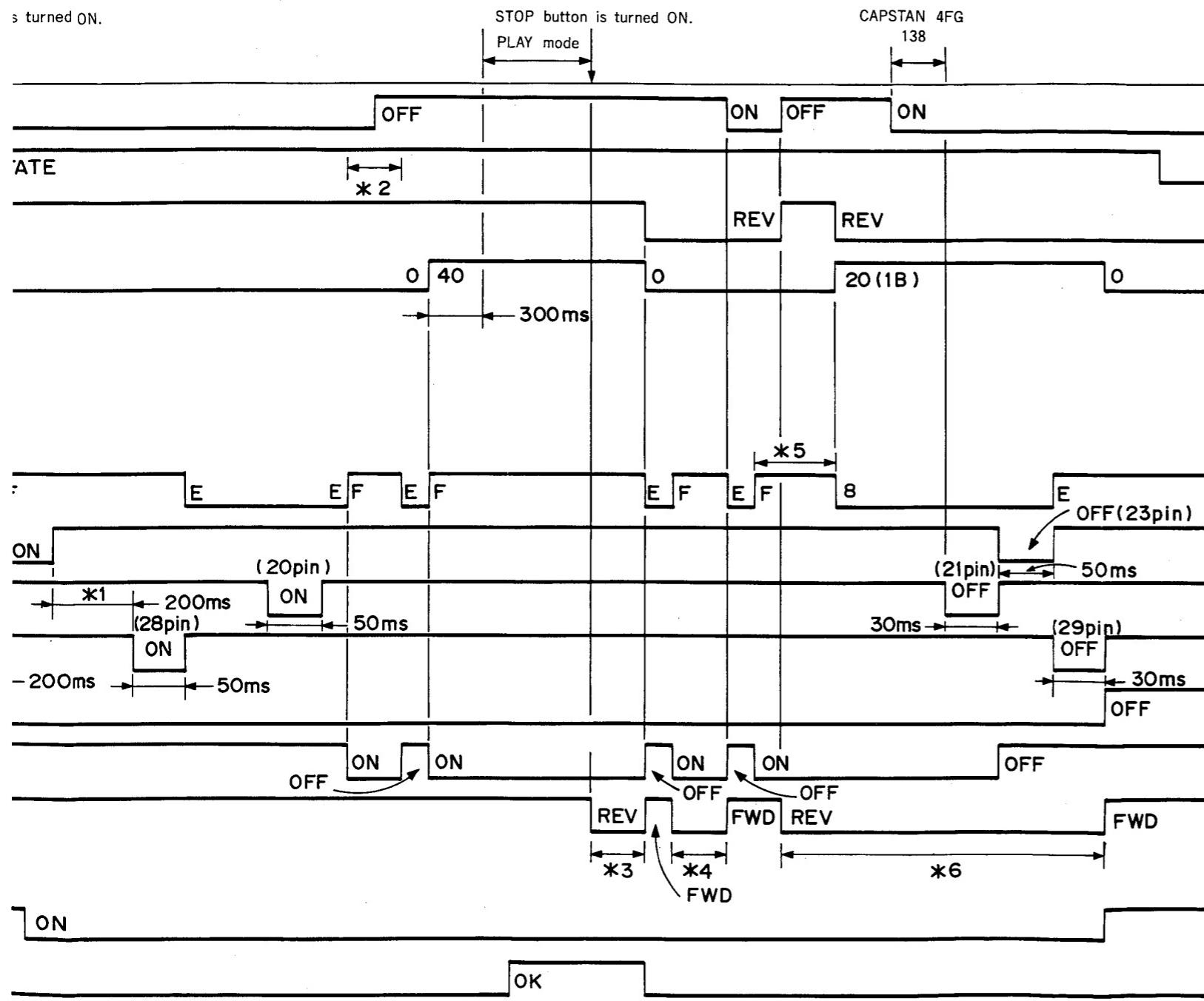


- \* 1: The threading Ring rotates, and the unit is put into the THREADING END mode. The thread-end switch turns "H".
- \* 2: The threading motor rotates, and then the threading ring turns in the counterclockwise direction.
- \* 3: S and T main brakes are released from the reel tables.
- \* 4: From cassette-in to the THREADING mode, the S-reel turns in the counterclockwise direction by 1/4 turn of threading ring's turn.
- \* 5: S-reel motor rotation is locked electrically. Tape runs from the T-reel in the THREADING mode.
- \* 6: The unit is put into the FWD mode temporarily, and then tense the tape.
- \* 7: The delay amount is about 100 $\mu$ s.
- \* 8: In the STOP mode, tape tension is released by 138 capstan 4FG for tape protection.

2. STOP→PLAY→STOP



is turned ON.



\* 1: Slack in the tape is taken up.

\* 2: Forward by 5 CTL to tense the tape.

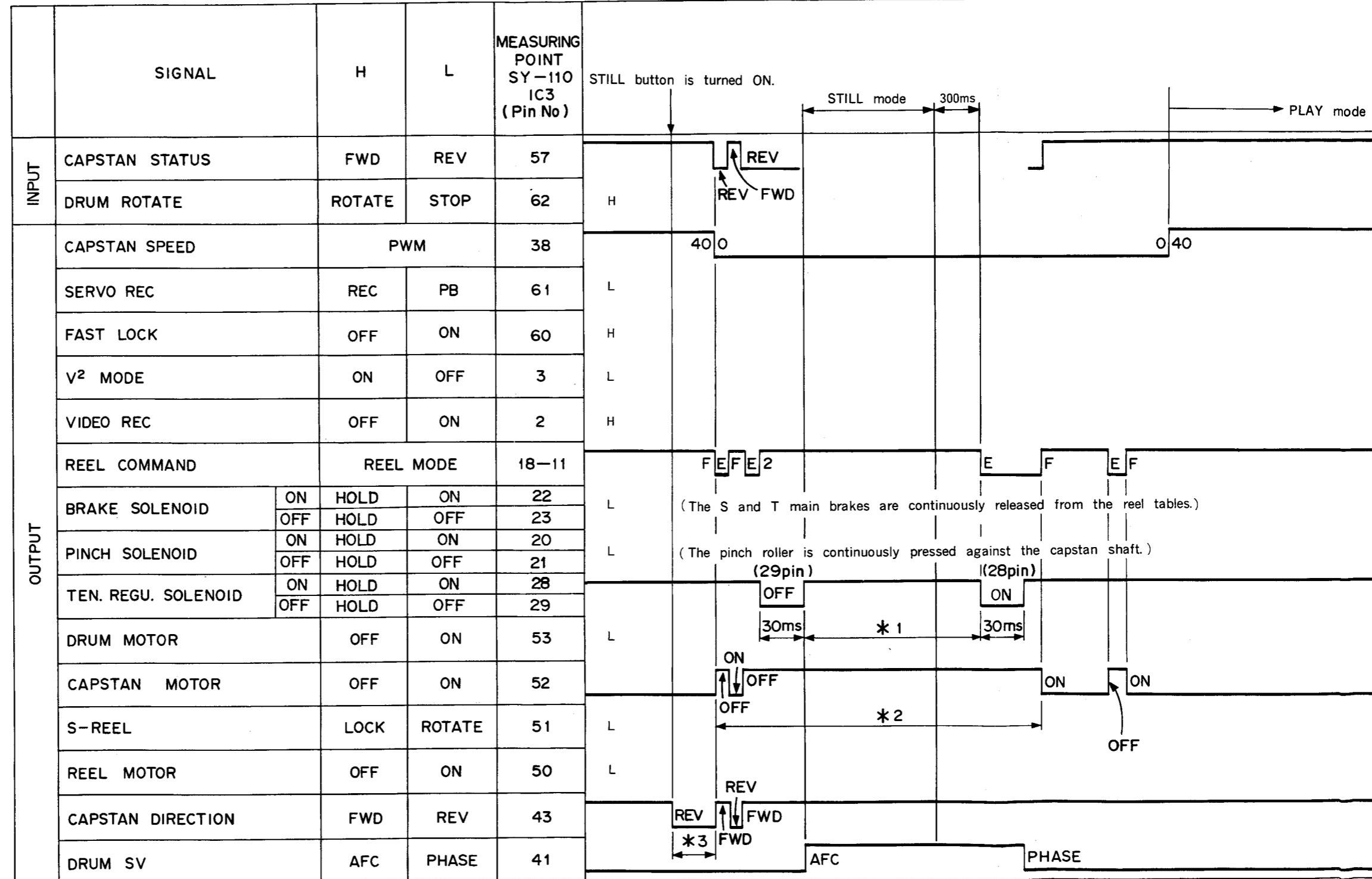
\* 3: The capstan motor is put into the reverse rotation mode for speed down of rotation. Then, the capstan motor stops its rotation.

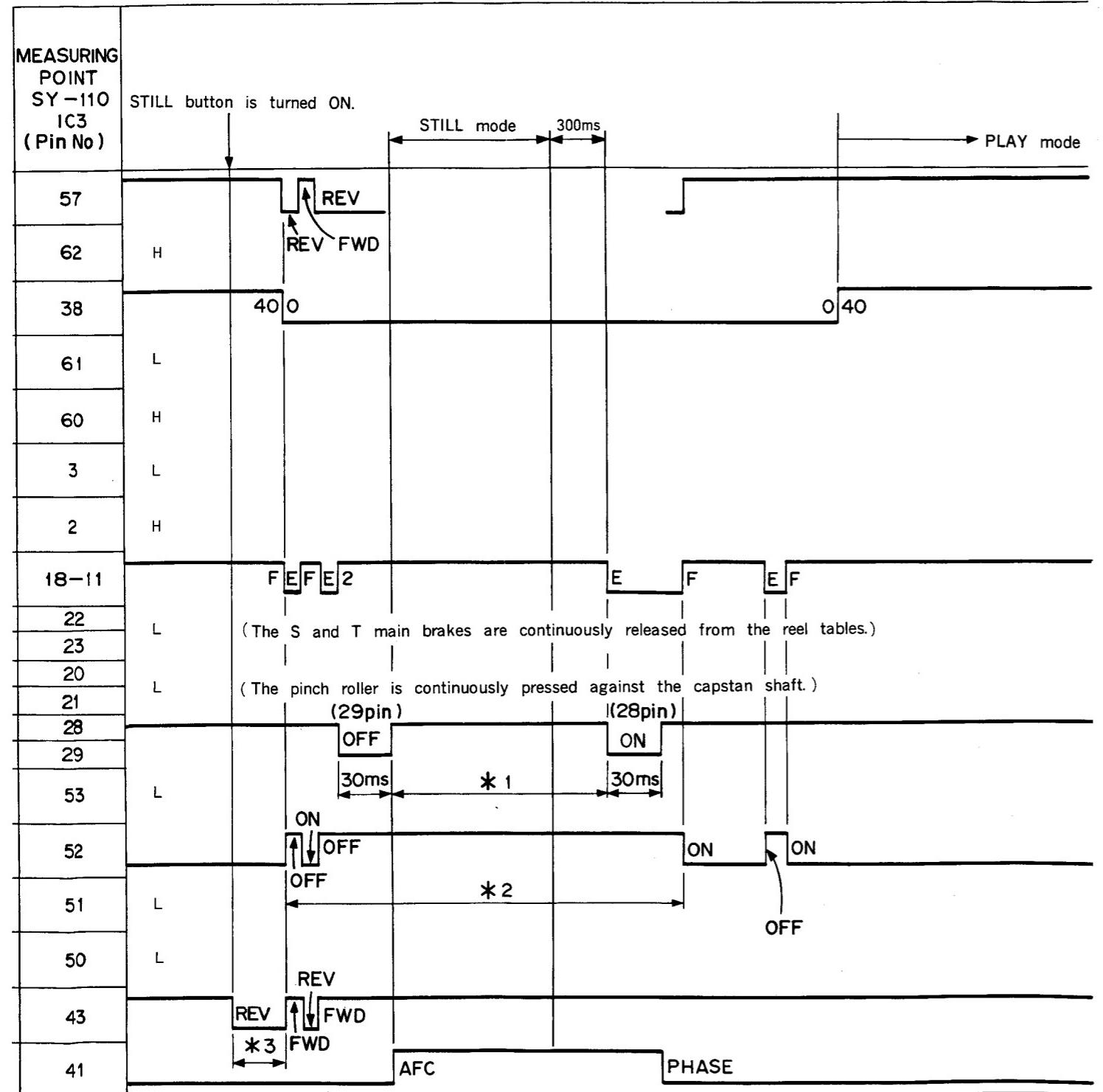
\* 4: This status is the same as \* 3. But this status is skipped acutually.

\* 5: Put the unit into the FWD mode, and then tense the tape.

\* 6: In the STOP mode, the tape tension is released by 138 capstan 4FG from tension regulator switch ON point for tape protection.

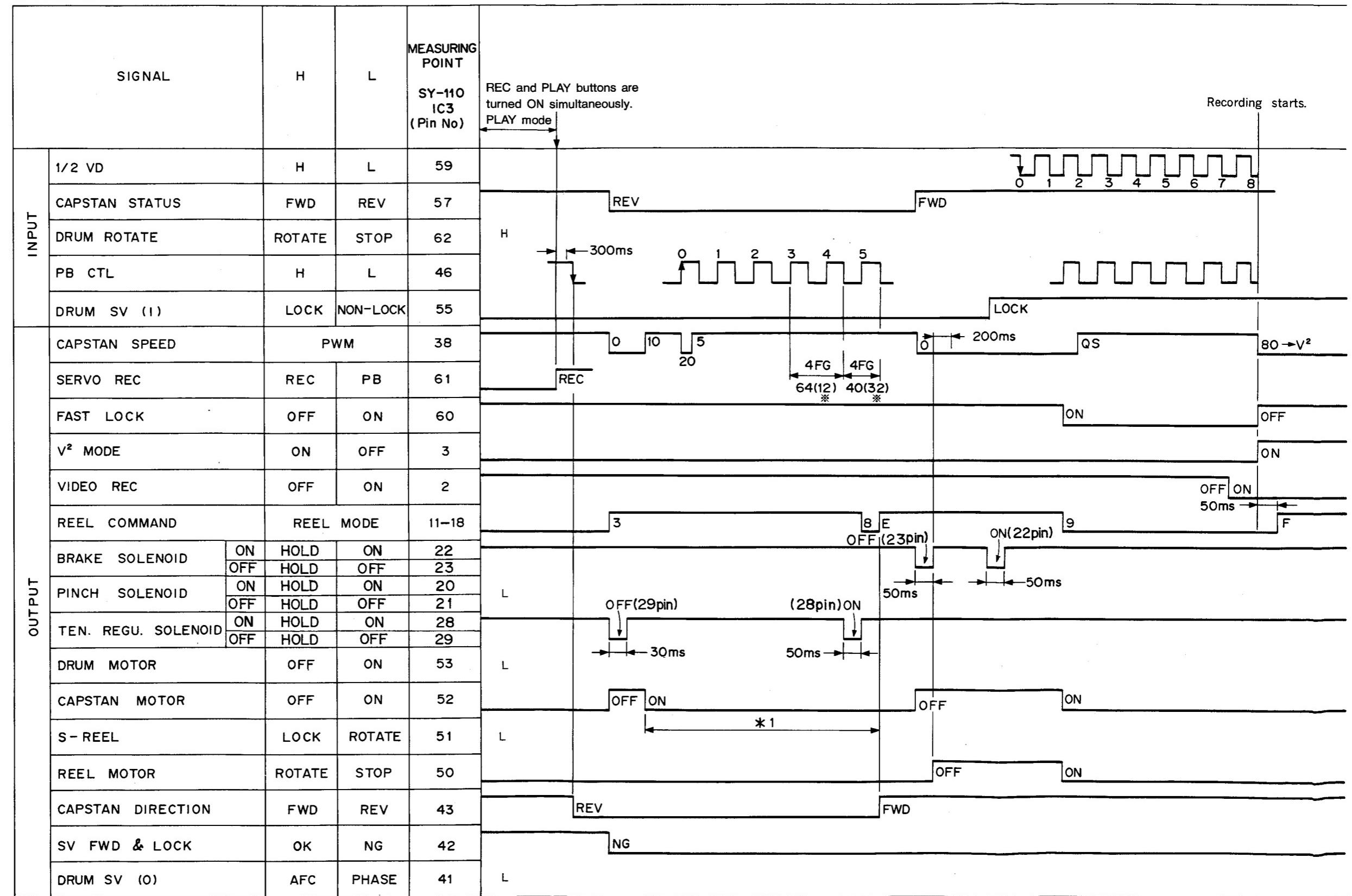
3. PLAY→SEARCH STILL→PLAY



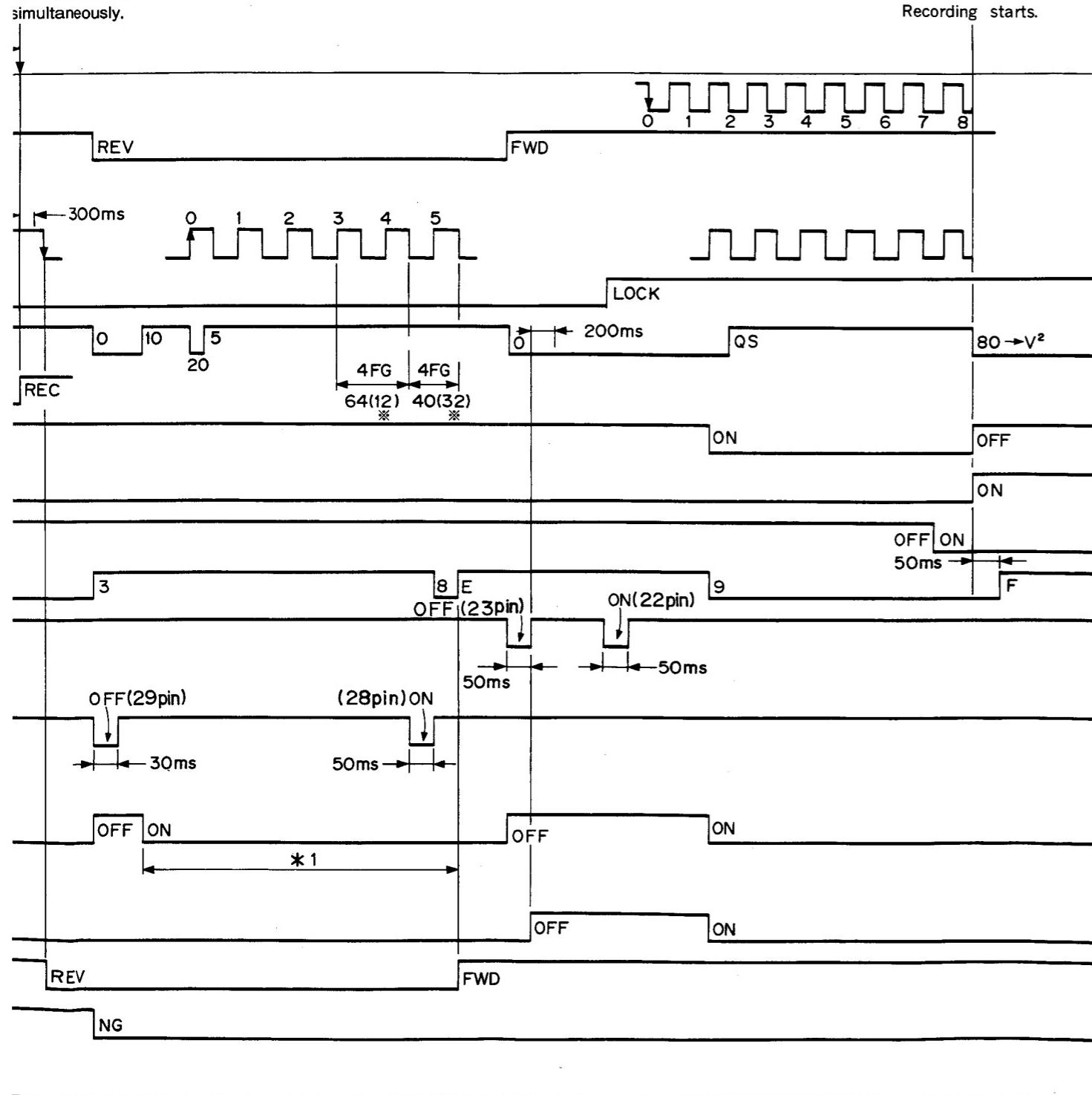


- \* 1: The tension solenoid is "OFF". (The pressure between video head and tape is maintained at constant.)
- \* 2: Rotation of the capstan motor stops.
- \* 3: Rotation speed of the capstan motor decreases.

4. PLAY→REC



AY buttons are simultaneously.

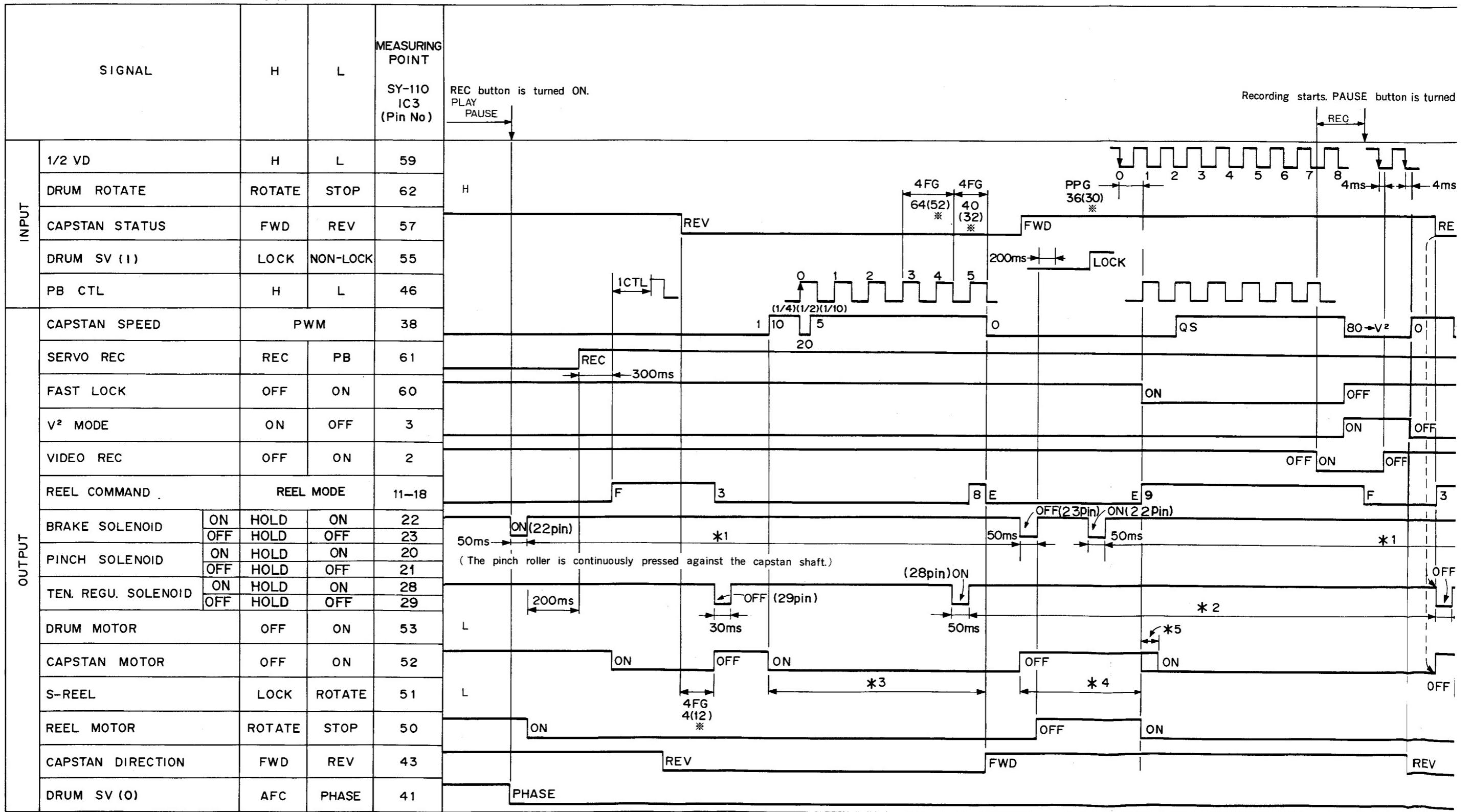


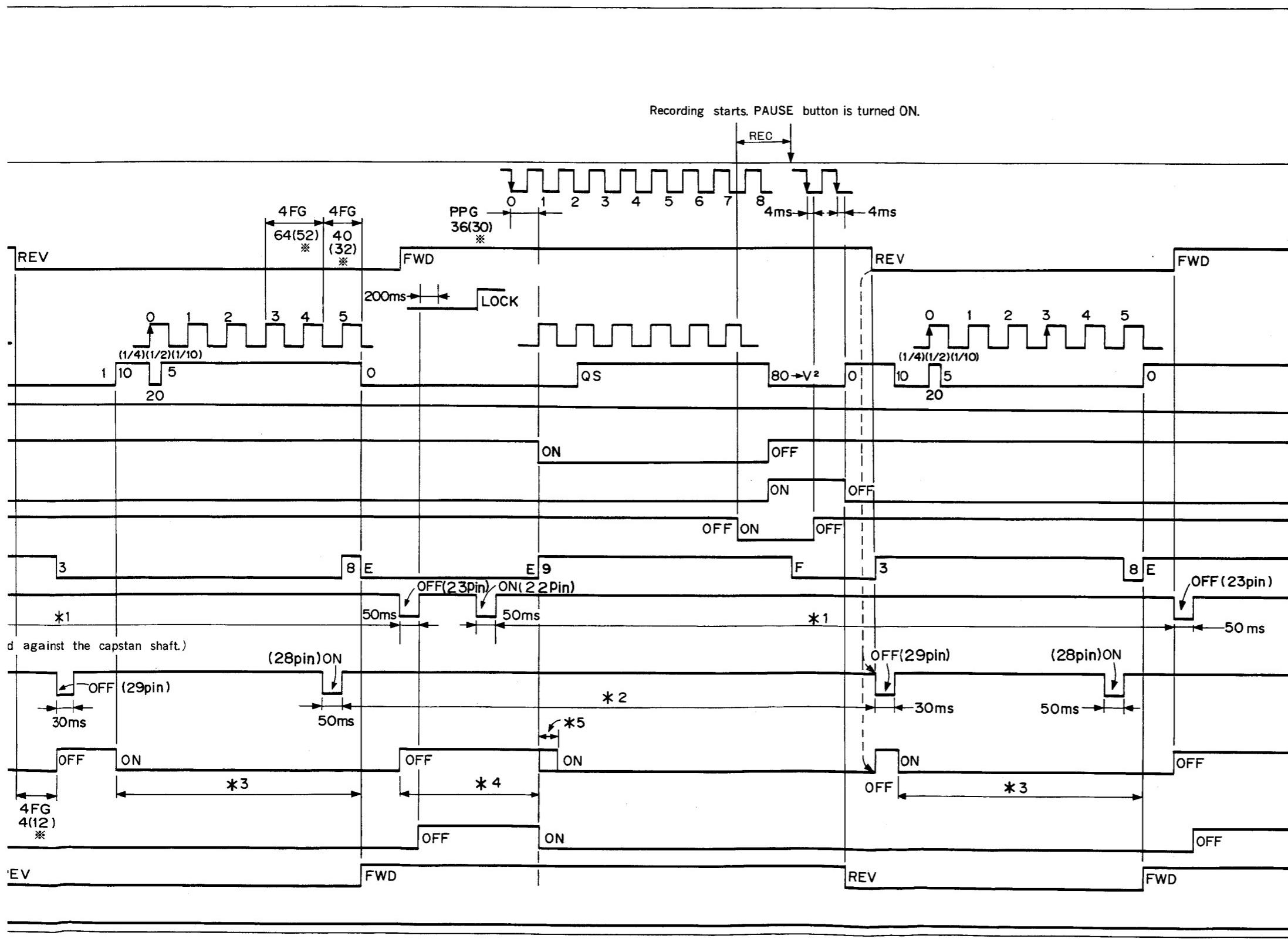
\* 1: The capstan motor rotates in the REV direction and rewind the tape 5.5 CTL.

**NOTE**

\*marked value is for PAL.

5. PLAY PAUSE → REC PAUSE → REC → REC PAUSE





- \* 1: S and T main brakes are released.
- \* 2: The tension regulator arm moves to the PLAY position.
- \* 3: The capstan motor rotates in the REV direction and rewind the tape 5.5 CTL
- \* 4: Rotation of the capstan motor stops.

**NOTE**

\*marked value is for PAL.

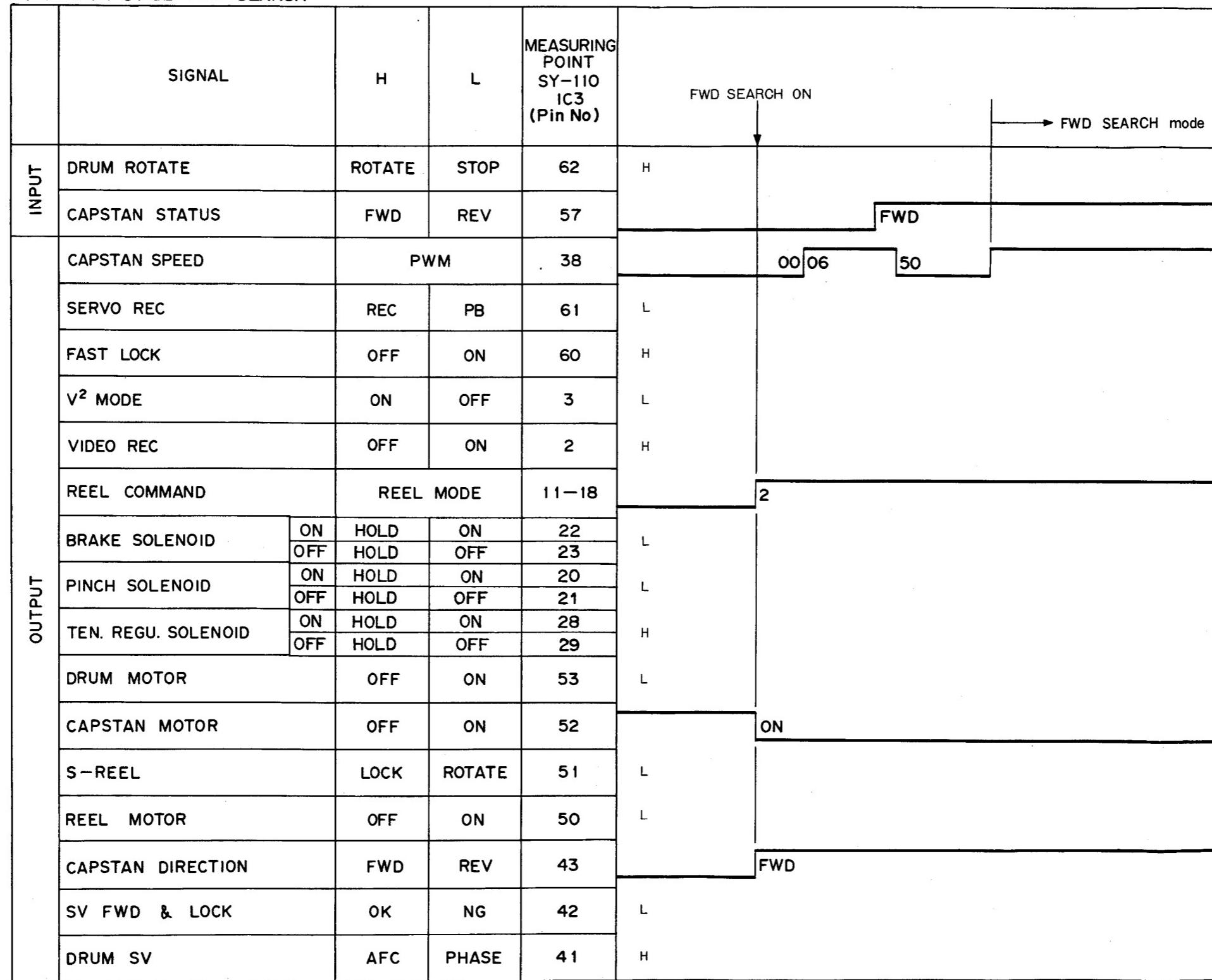
6. SEARCH STILL→REV SEARCH

	SIGNAL	H	L	MEASURING POINT SY-110 IC3 (Pin No)	REV SEARCH ON	REV SEARCH mode
INPUT	CAPSTAN STATUS	FWD	REV	57	REV	* 1:
	DRUM ROTATE	ROTATE	STOP	62	H	
	CAPSTAN SPEED	PWM		38	00 06 50	
	SERVO REC	REC	PB	61	L	
	FAST LOCK	OFF	ON	60	H	
	V <sup>2</sup> MODE	ON	OFF	3	L	
	VIDEO REC	OFF	ON	2	H	
	REEL COMMAND	REEL MODE		11-18	3	
	BRAKE SOLENOID	ON	HOLD	22		(The S and T main brakes are continuously released from the reel tables.)
		OFF	HOLD	23		
OUTPUT	PINCH SOLENOID	ON	HOLD	20		(The pinch roller is continuously pressed against the capstan shaft.)
		OFF	HOLD	21		
	TEN. REGU. SOLENOID	ON	HOLD	28		(The tension regulator arm is located in the PLAY position.)
		OFF	HOLD	29		
	DRUM MOTOR	OFF	ON	53	L	
	CAPSTAN MOTOR	OFF	ON	52	ON	
	S-REEL	LOCK	ROTATE	51	L	
	REEL MOTOR	OFF	ON	50	L	
	CAPSTAN DIRECTION	FWD	REV	43	REV	
	SV FWD & LOCK	OK	NG	42	L	
	DRUM SV	AFC	PHASE	41	H	

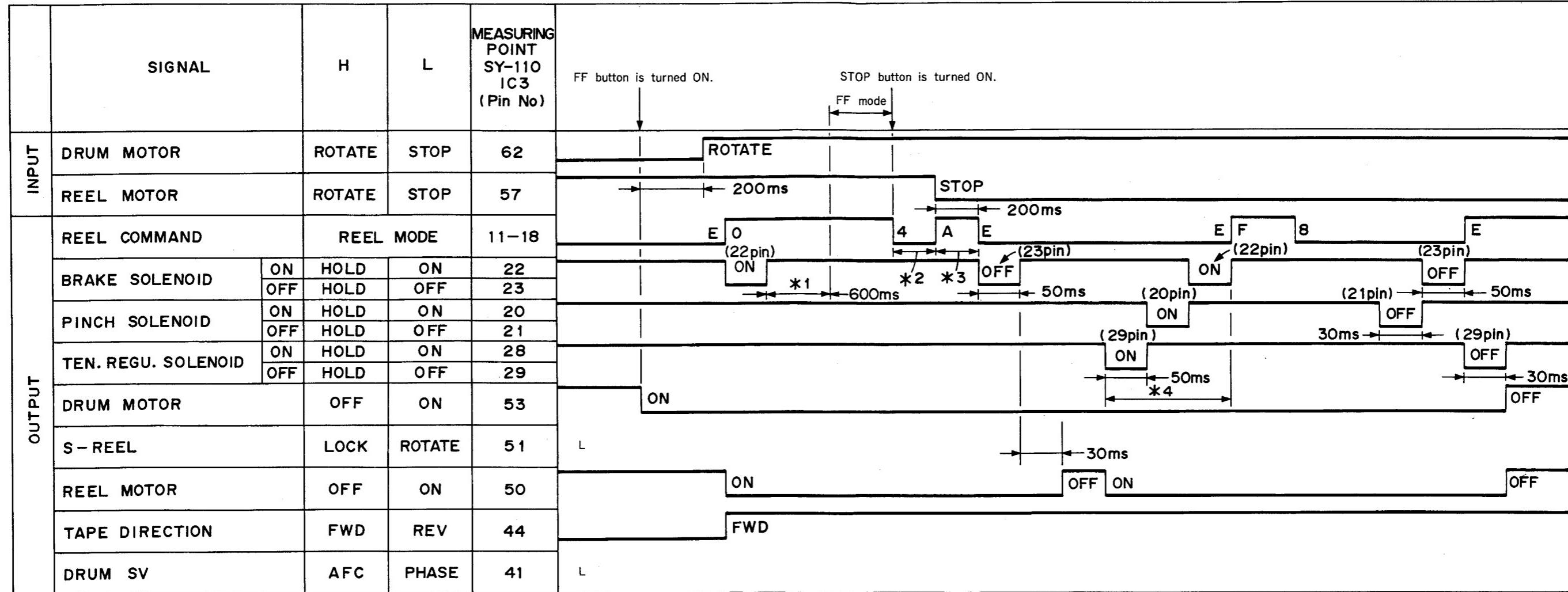
H	L	MEASURING POINT SY-110 IC3 (Pin No)	
FWD	REV	57	REV SEARCH ON
ROTATE	STOP	62	
PWM		38	
REC	PB	61	
OFF	ON	60	
ON	OFF	3	
OFF	ON	2	
REEL MODE		11-18	
HOLD	ON	22	(The S and T main brakes are continuously released from the reel tables.)
HOLD	OFF	23	
HOLD	ON	20	(The pinch roller is continuously pressed against the capstan shaft.)
HOLD	OFF	21	
HOLD	ON	28	(The tension regulator arm is located in the PLAY position.)
HOLD	OFF	29	
OFF	ON	53	
OFF	ON	52	
LOCK	ROTATE	51	
OFF	ON	50	
FWD	REV	43	
OK	NG	42	
AFC	PHASE	41	

\* 1: When CAPSTAN STATUS signal is "L" (REV),  
this status is skipped.

7. SEARCH STILL→FWD SEARCH



8. STOP→FF→STOP



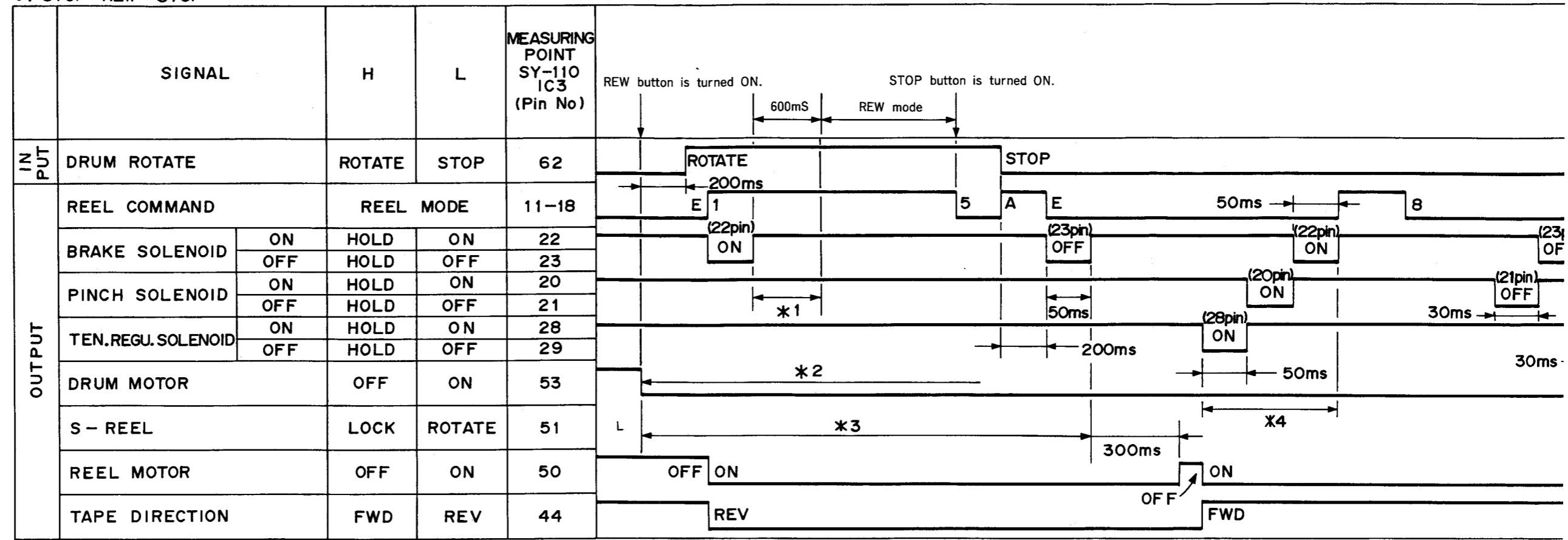
\* 1: This status prevents the mode change until the rotation of reel motor keeps certain speed.

\* 2: Reverse voltage is supplied to the motor in order to brake.

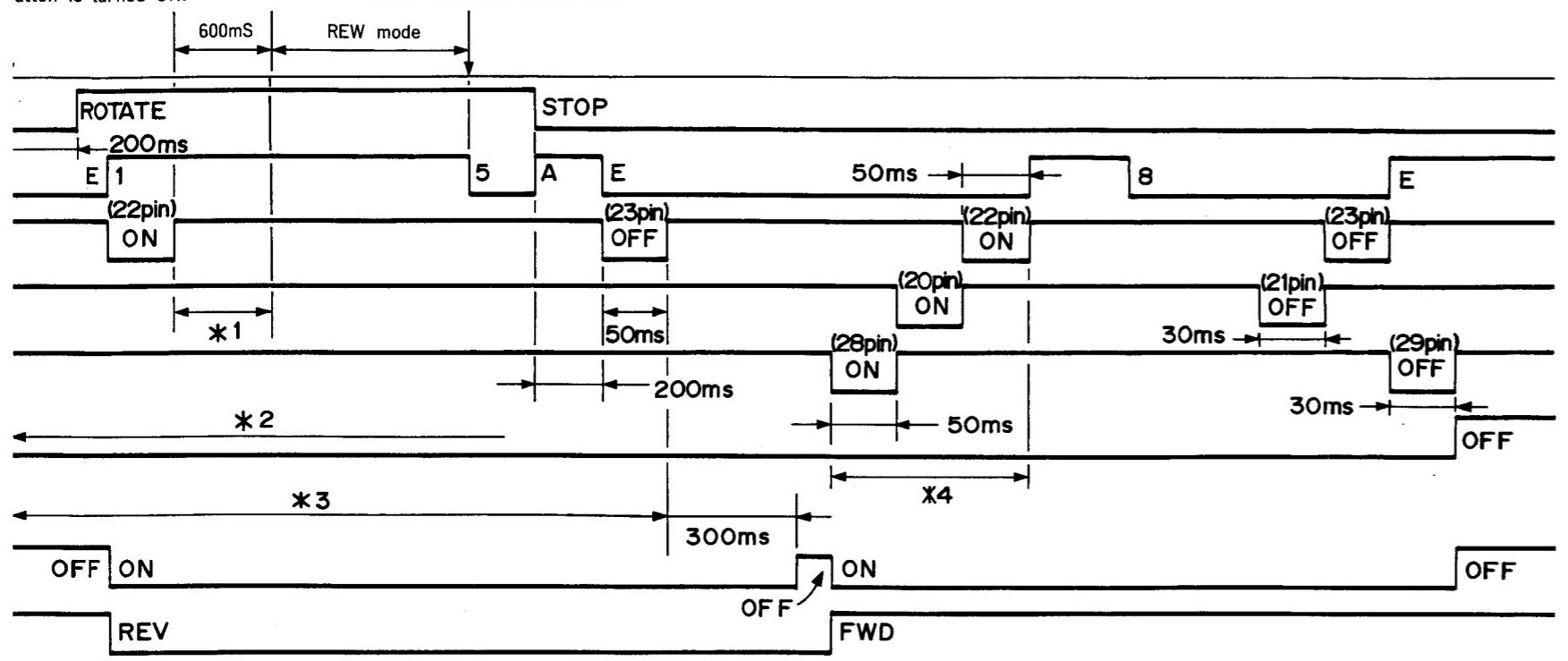
\* 3: S-reel turns to take up any slack in the tape.

\* 4: The TEN.REGU. solenoid turns ON. The pinch roller presses against the capstan shaft. Then, the reel brake is released.

9. STOP→REW→STOP



button is turned ON. STOP button is turned ON.



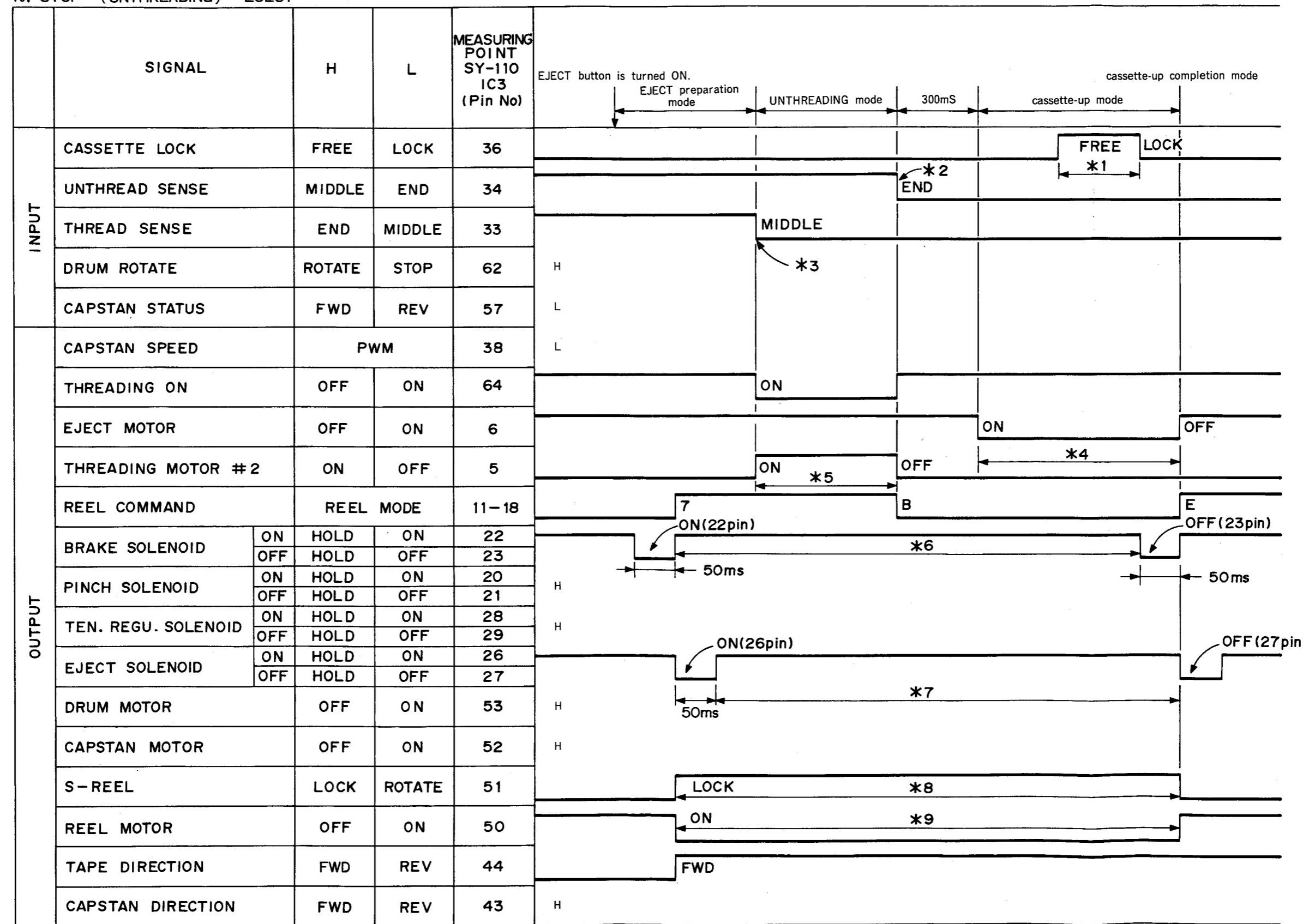
\* 1: This status prevents the mode change until the rotation of reel motor keeps certain speed.

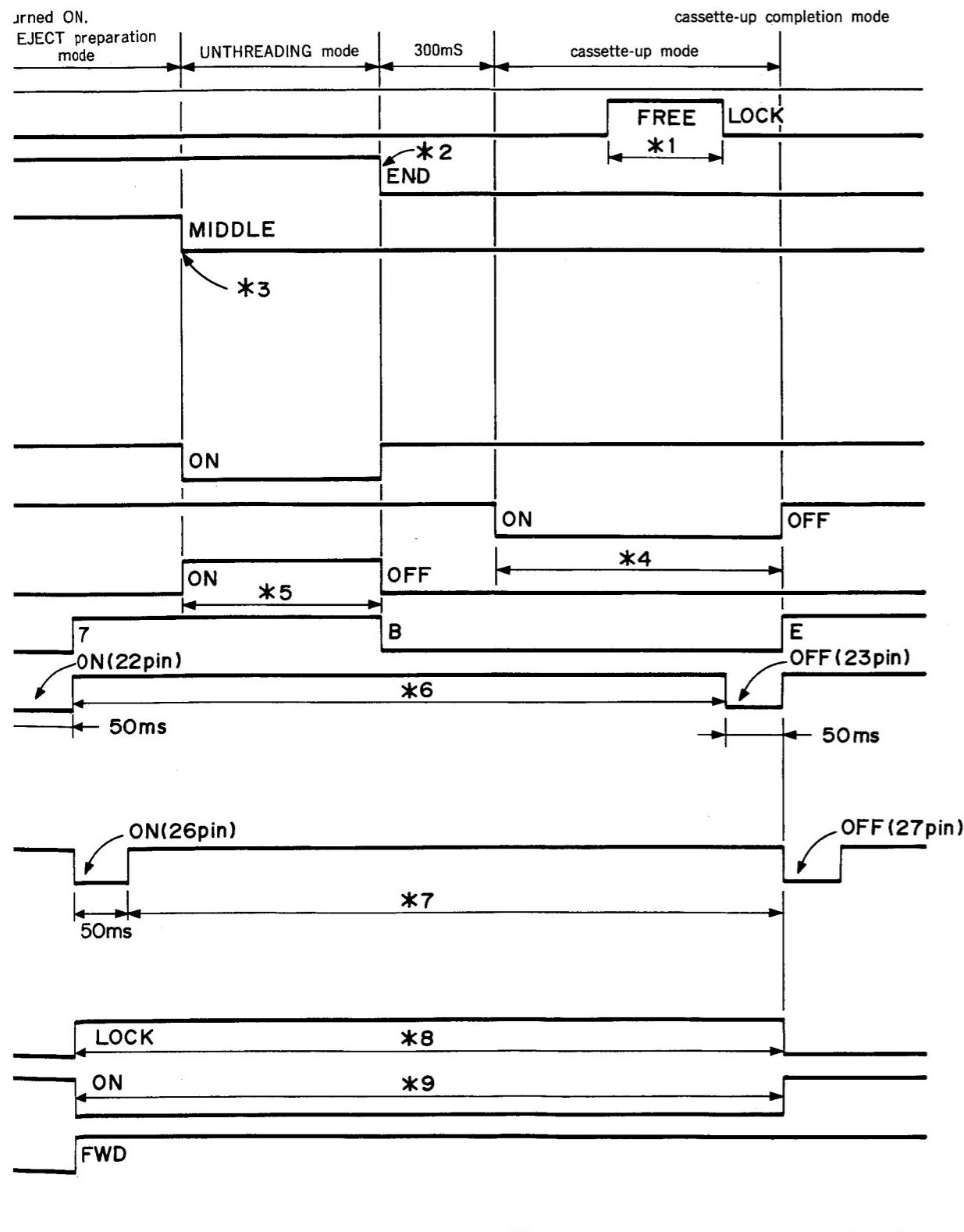
\* 2: Reverse voltage is supplied to the motor in order to brake.

\* 3: S-reel turns to take up any slack in the tape.

\* 4: The TEN.REGU. solenoid turns ON. The pinch roller presses against the capstan shaft. Then, the reel brake is released.

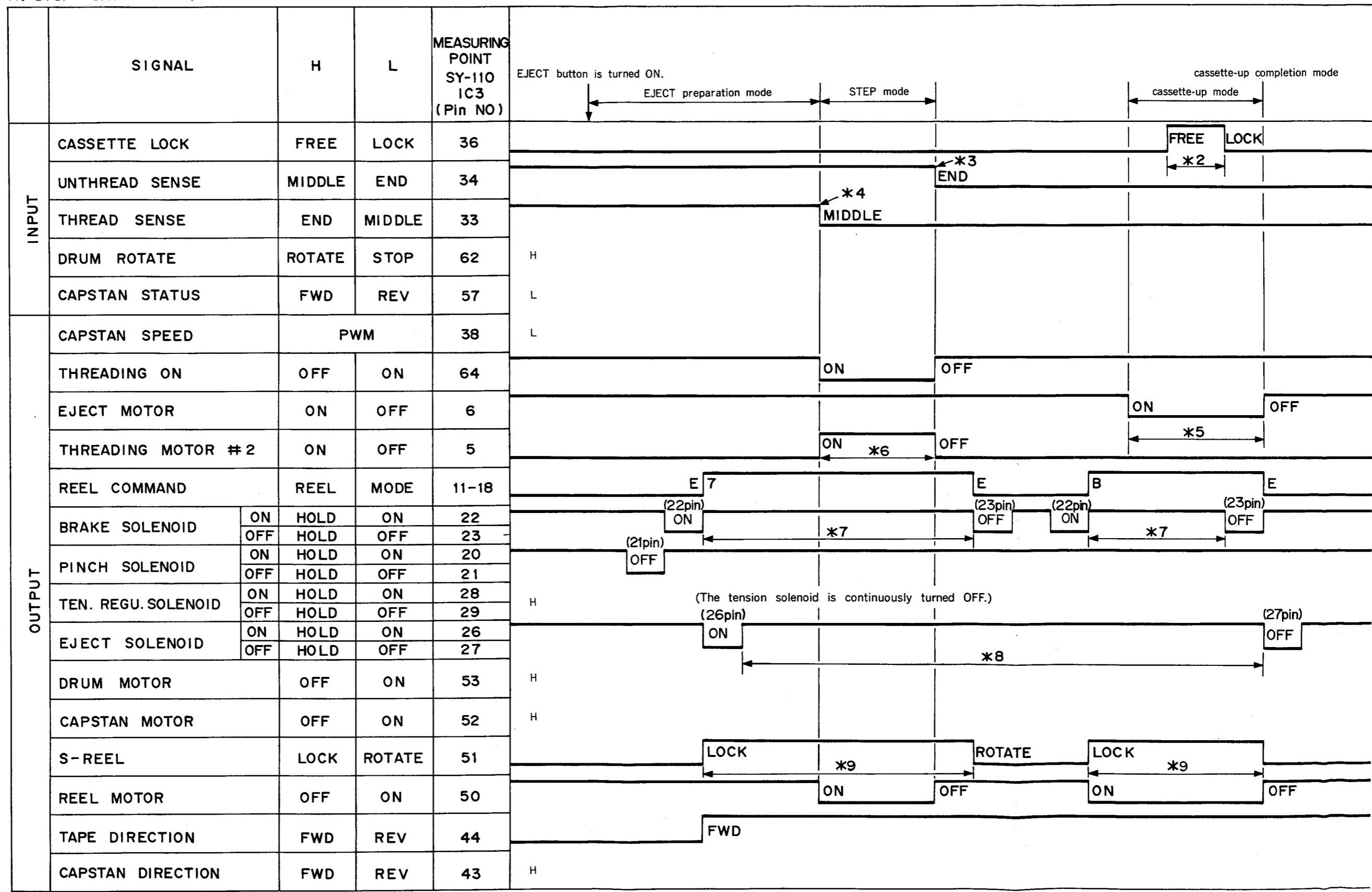
10. STOP → (UNTHREADING) → EJECT



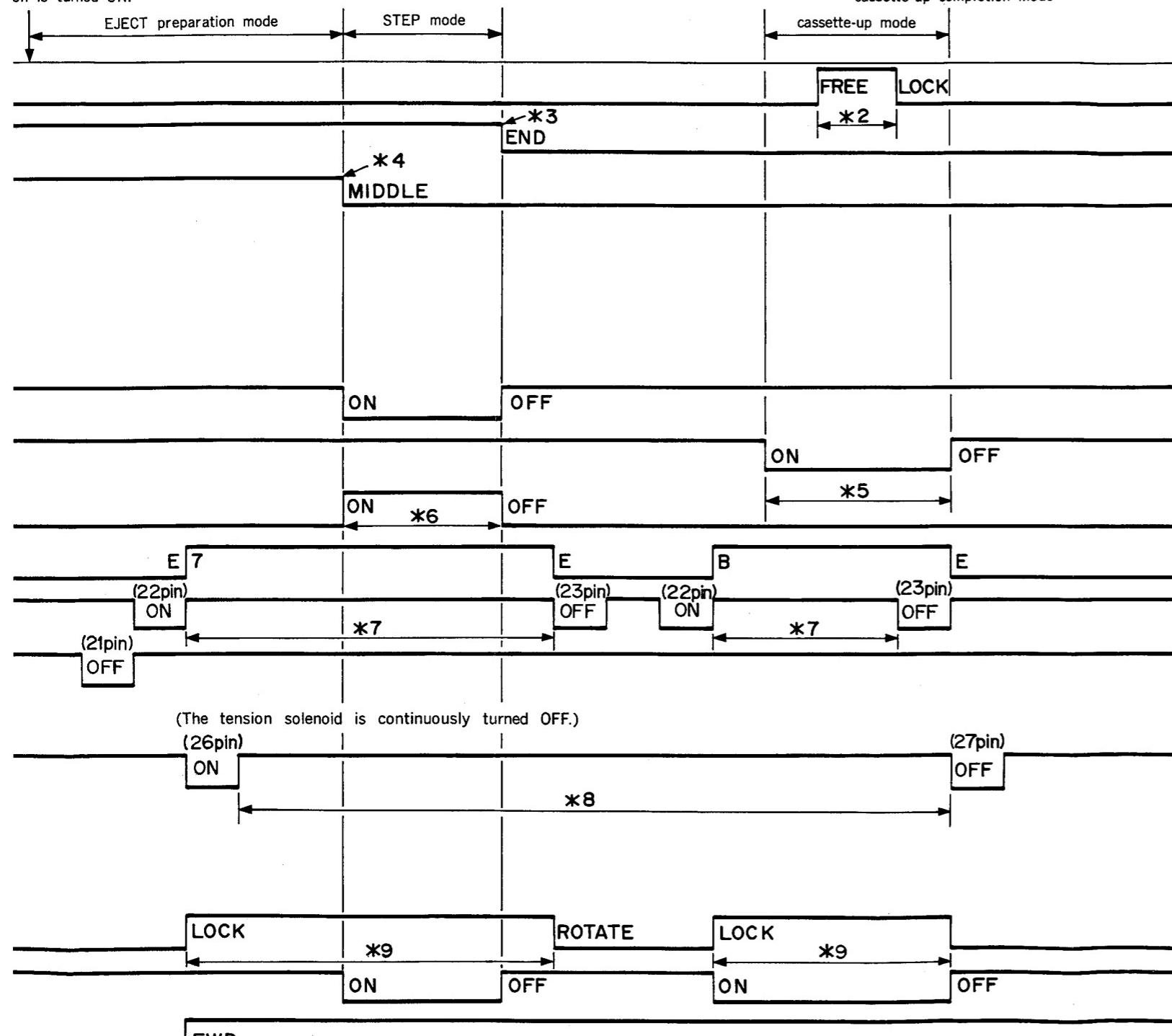


- \* 1: When the eject motor rotates, the lock of the cassette-up compartment is released, and then the cassette-lock switch enters FREE once. When cassette-up compartment moves up, the cassette-lock switch locks again.
- \* 2: The threading ring rotates. The UNTHREADING END mode is released, and then UNTHREAD SENSE signal becomes "L".
- \* 3: The threading ring rotates. The THREADING END mode is released, and then the THREAD SENSE signal becomes "L".
- \* 4: The EJECT motor rotates, and then releases the lock of the cassette-up compartment.
- \* 5: The threading ring rotates in the clockwise direction.
- \* 6: S and T main brakes are released from the reel tables.
- \* 7: The EJECT solenoid turns ON. Roller of the threading ring is released.
- \* 8: S-reel motor is locked. Therefore, the tape is rewound in T-reel.
- \* 9: The reel motor rotates.

11. STOP → UNTHREADING/STEP MODE → EJECT



on is turned ON.



\* 1: When the slack is detected, the threading ring moves once in the STEP mode. (The threading ring does not move to the EJECT completion position.) When pushing the EJECT button four or five times, the threading ring moves to the EJECT completion position.

\* 2: When the EJECT motor rotates, lock of the cassette-up compartment is released.

The cassette-lock switch turns FREE once. When the cassette-up compartment moves up, the cassette-lock switch is locked again.

\* 3: The threading ring rotates and enters UN-THREADING END mode. The signal becomes "L".

\* 4: The threading ring rotates, and releases the THREADING END mode. The THREAD SENSE signal becomes "L".

\* 5: EJECT motor rotates, and then releases the lock of the cassette-up compartment.

\* 6: The threading ring rotates in the clockwise direction.

\* 7: S and T main brakes are released from the reel tables.

\* 8: The EJECT solenoid turns ON, and then roller of the threading ring is released.

\* 9: The S-reel motor is locked, Therefore, the tape is rewound in the T-reel.

## SECTION 4

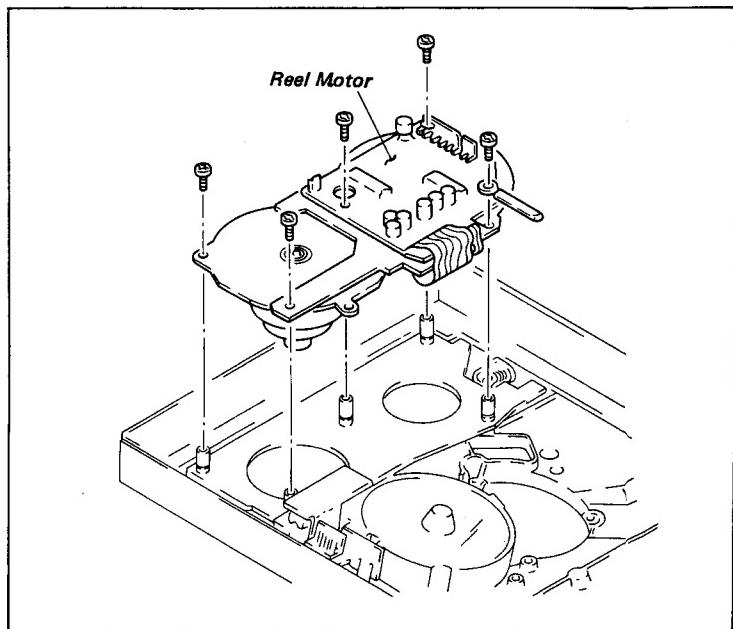
### REPLACEMENT OF MAJOR PARTS

#### 4-1. REPLACEMENT OF THE REEL MOTOR

**Mode:** Unthreading end

**Replacement procedure:**

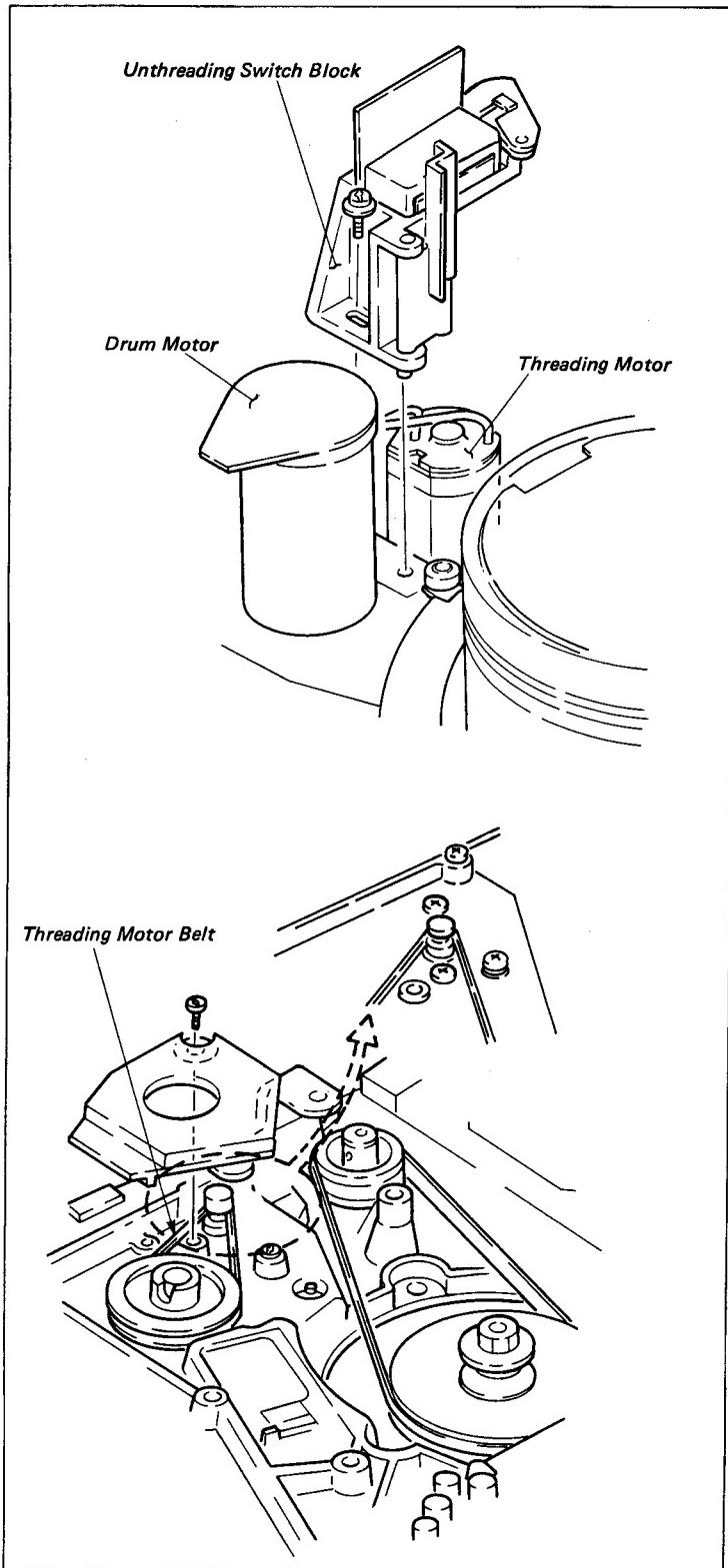
- (1) Remove the Left Side Panel and the Bottom Plate.
- (2) Remove the CN Retainer and Battery Case.
- (3) Remove the SD-16P Board, and then remove the reinforcement stay.
- (4) Disconnect the CNP51 and CNP52 of the Reel Motor.
- (5) Remove the five screws as shown in the figure and replace the Reel Motor.
- (6) Perform the adjustments as described in Section 4-17.



#### 4-2. REPLACEMENT OF THE THREADING MOTOR

##### Replacement procedure:

- (1) Disconnect the connector from the SW-24 Board.
- (2) Remove the KY-110P Board and the Meter Panel Block.
- (3) Disconnect the CN4 on the SY-110 Board from the Threading Motor.
- (4) Remove the Unthreading Switch Block.
- (5) Remove the Battery Case.
- (6) Remove the Threading Motor Belt of the motor side.
- (7) Remove the defective Threading Motor.
- (8) Thread the connector of the new motor through the hole of the chassis, and then install the new motor.
- (9) Thread the harness of the motor through the harness holder, and then connect it to CN4 on the SY-110 Board.
- (10) Re-assemble by reversing steps.
- (11) Perform the adjustments as described in Section 4-17.

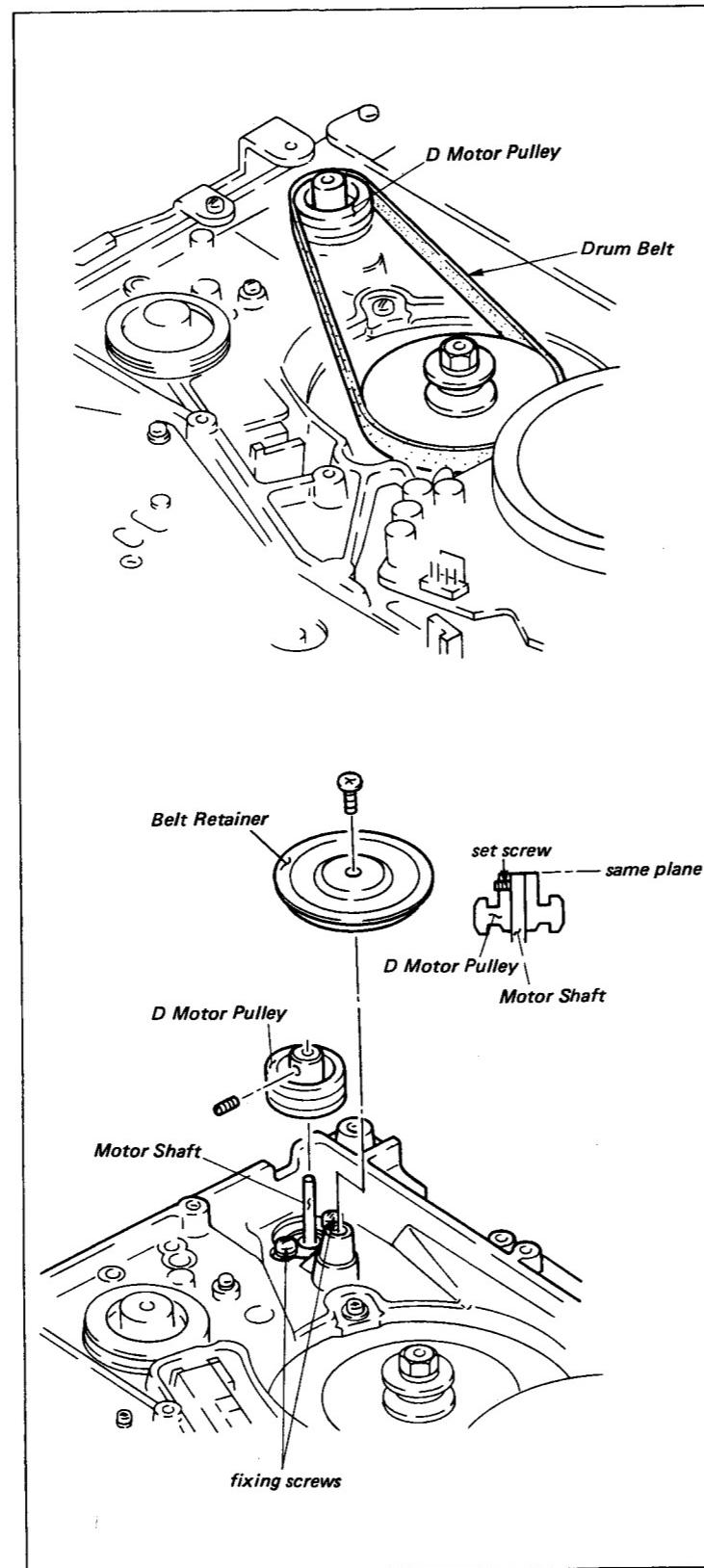


#### 4-3. REPLACEMENT OF THE DRUM MOTOR

Tool: Allen wrench (across flat has 0.89 mm)

##### Replacement procedure:

- (1) Open the SD-16P Board, and then disconnect the CN2 on the SD-16P Board from the Drum Motor.
- (2) Remove the Battery Case.
- (3) Remove the Belt Retainer.
- (4) Remove the Drum Belt.
- (5) Remove the D Motor Pulley with an allen wrench.
- (6) Remove the defective Drum Motor. Thread the connector of the new motor through the hole of the chassis, and then install the Drum Motor.
- (7) Install the D Motor Pulley into the motor shaft so that the positional relationship of the D Motor Pulley and motor shaft meets the required specification.
- (8) Clean the Drum Belt and install the Belt.   
NOTE: The white mark of the Drum Belt should be outside.
- (9) Install the Belt Retainer.
- (10) Thread the connector of the new motor through the harness holder, and connect to CN2 on the SD-16P Board.
- (11) Install the SD-16P Board.
- (12) Install the Battery Case.
- (13) Perform the adjustments as described in Section 4-17.



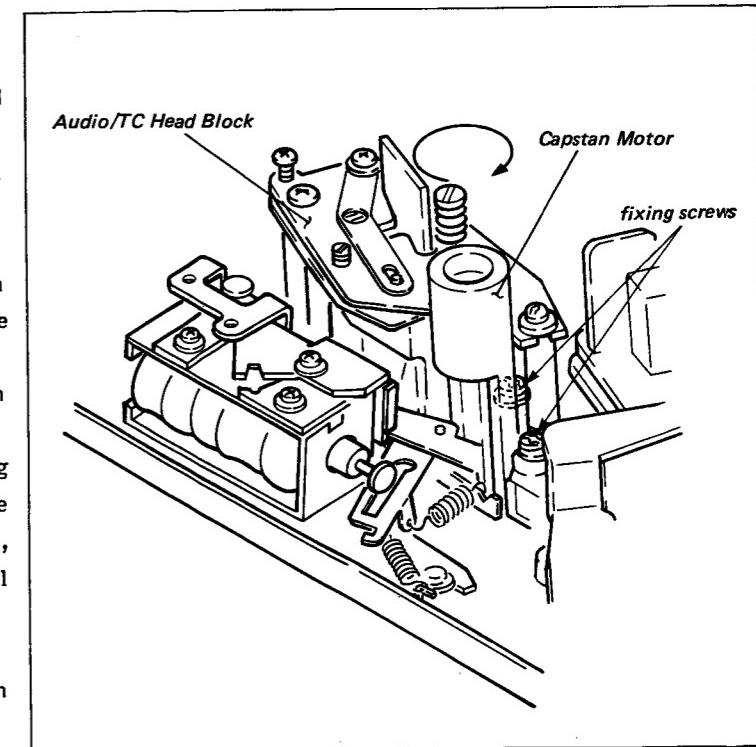
#### 4-4. REPLACEMENT OF THE CAPSTAN MOTOR

The Capstan Motor Shield Plate is pasted on the Capstan Motor. Therefore, when replacing the Capstan Motor, replace the following part simultaneously.

A-6759-147-A : SHIELD ASS'Y, CAPSTAN

##### Replacement procedure:

- (1) Remove the Battery Case.
- (2) Disconnect the connectors, CNP1 and CNP2 from the Capstan Motor.
- (3) Remove the fixing screw of the VRA-1 Board, and then open it.
- (4) Remove the Audio/TC Head Block.
- (5) Remove the two fixing screws as shown in the figure, and then remove the Capstan Motor.
- (6) Paste the Capstan Shield Plate Ass'y on the Capstan Motor.
- (7) Install the Capstan Motor. While turning the Capstan Motor in the clockwise direction as viewed from top of the unit, and tighten the fixing screws. Be careful not to scratch the capstan shaft.
- (8) Re-assemble by reversing steps.
- (9) Perform the adjustments as described in Section 4-17.



#### 4-5. REPLACEMENT OF THE UPPER DRUM

- The Rotary Video Heads cannot be replaced individually. Therefore, replace the entire Upper Drum Assembly when replacing the Rotary Video Heads.

**Tool:**

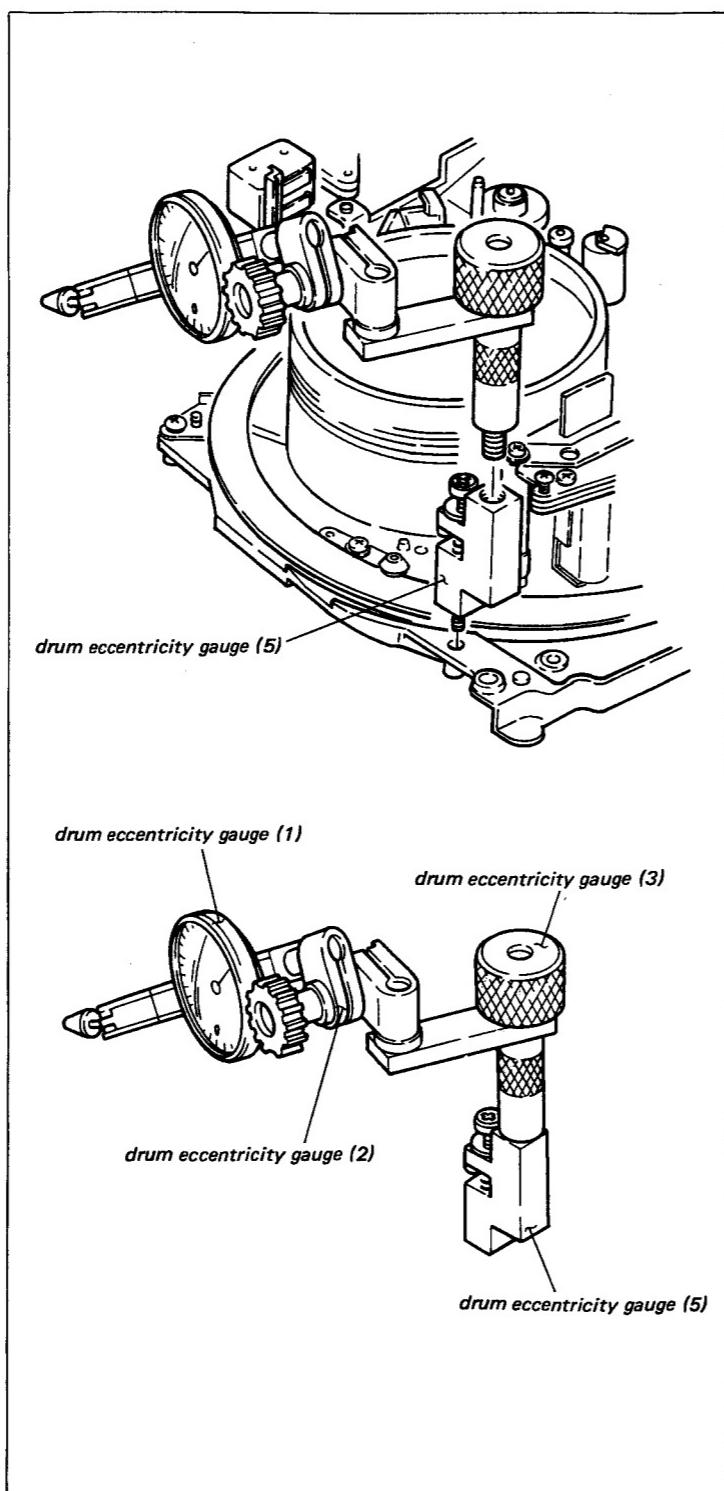
- Drum eccentricity gauge (1)
- Drum eccentricity gauge (2)
- Drum eccentricity gauge (3)
- Drum eccentricity gauge (5)
- Cleaning fluid
- Cleaning piece

##### Replacement procedure:

- (1) Remove the Drum Cover.
- (2) Remove the two fixing screws, and then remove the Brush Base.
- (3) Disconnect the seven connectors from the round printed circuit board at the center of the drum.
- (4) Remove the two fixing screws, and then remove the Upper Drum.
- (5) Clean the matching surfaces of the flange and new Upper Drum Assembly with a cloth moistened with cleaning fluid.  
(If there is a spacer between drum and flange, it should be remained in place, or be re-installed in the same place with the new Upper Drum Assembly. The spacer is 0.01 mm, 0.03 mm, 0.05 mm or 0.1 mm thick.)
- (6) Place the Upper Drum Assembly so that the silk screened "BCH" on the PA Board is close to the marked "RCB" side of the round printed circuit board as shown in the figure. Thread the two fixing screws snugly but do not tighten.

##### Adjustment procedure:

- (1) Remove the VRA-1 Board, and then disconnect the four connectors.
- (2) Assemble the drum eccentricity gauge (1), (2), (3) and (5) as shown in the figure. Mount the assembled gauges on the unit so that the tip probe is positioned at a point about 5 mm from the top edge of the Upper Drum.



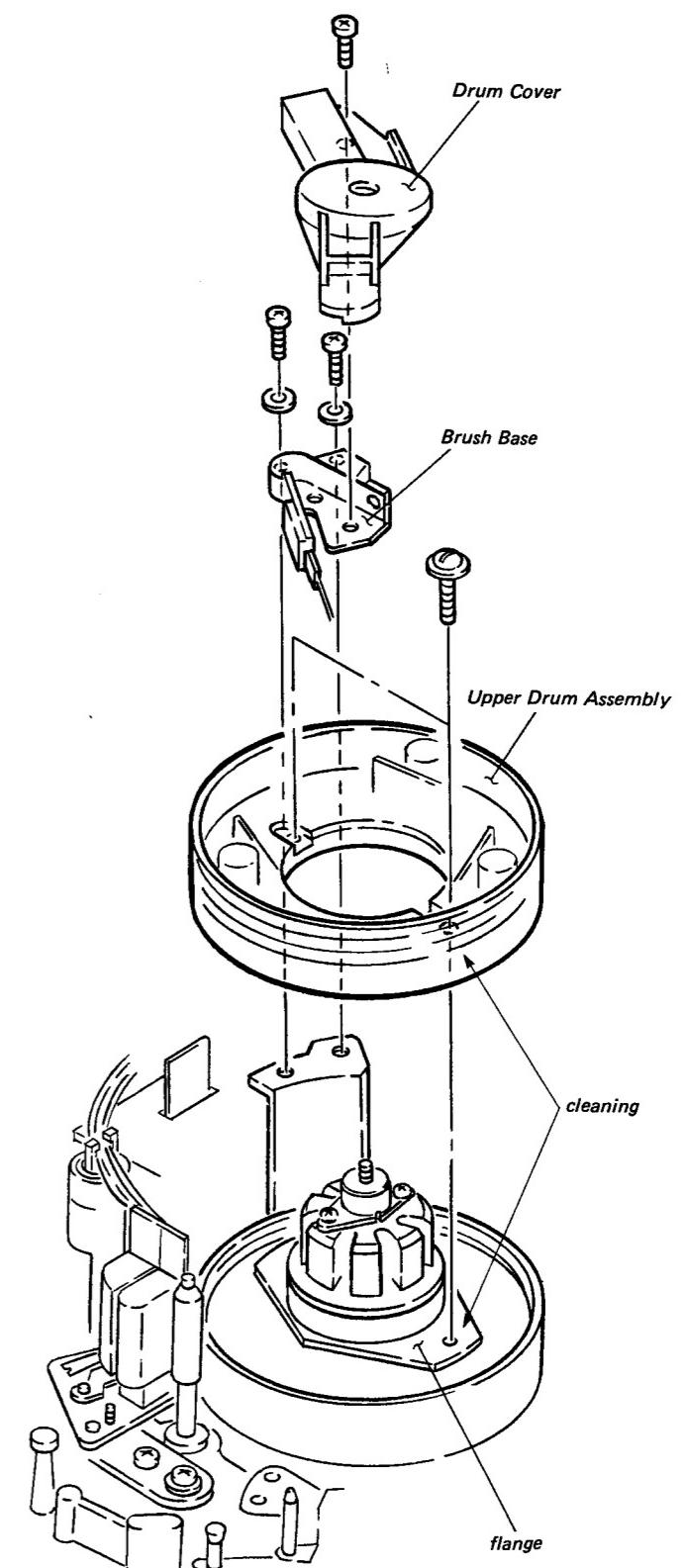
4-5

(3) Turn the Upper Drum slowly in the clockwise direction, and then confirm the pointer deflection of the gauge is within 5 microns during one complete turn of the Upper Drum. If this specification is satisfied, proceed to Step (5). If the gauge deflection is out of specification, perform the remaining steps.

- (4) Tap the upper side of the Upper Drum with a nylon hammer or a screwdriver handle so that the gauge deflection remains within 5 microns.
- (5) After the adjustment, tighten the two fixing screws alternately and gradually with a tightening torque (8 Kg.cm).
- (6) After the screws are tightened, check again that the eccentricity of the Upper Drum is within 5 microns.
- (7) Connect the seven connectors to the Upper Drum.
- (8) Install the Brush Base so that the brush height correspond to the height of the strip-ring groove.
- (9) Install the Drum Cover.

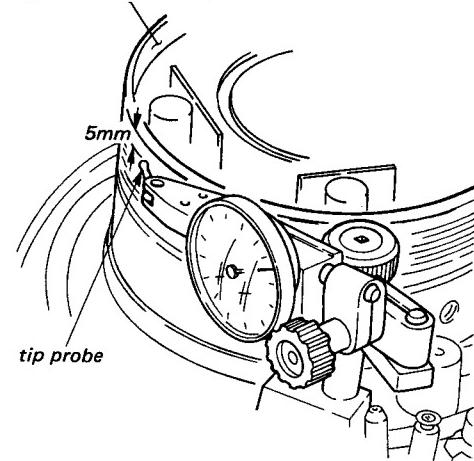
**NOTE:** Put the pin on the back of the Drum Cover into the hole of the Brush Base. If it is not satisfied, the Drum does not turn as the Upper Drum touches the Drum Cover.

- (10) Perform the adjustments as described in Section 4-17.

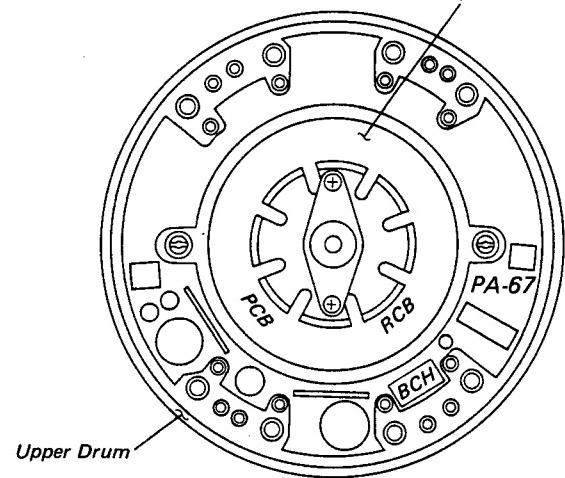


4-6

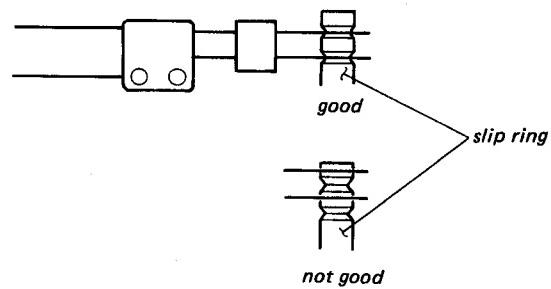
*Upper Drum Assembly*



*round printed circuit board*



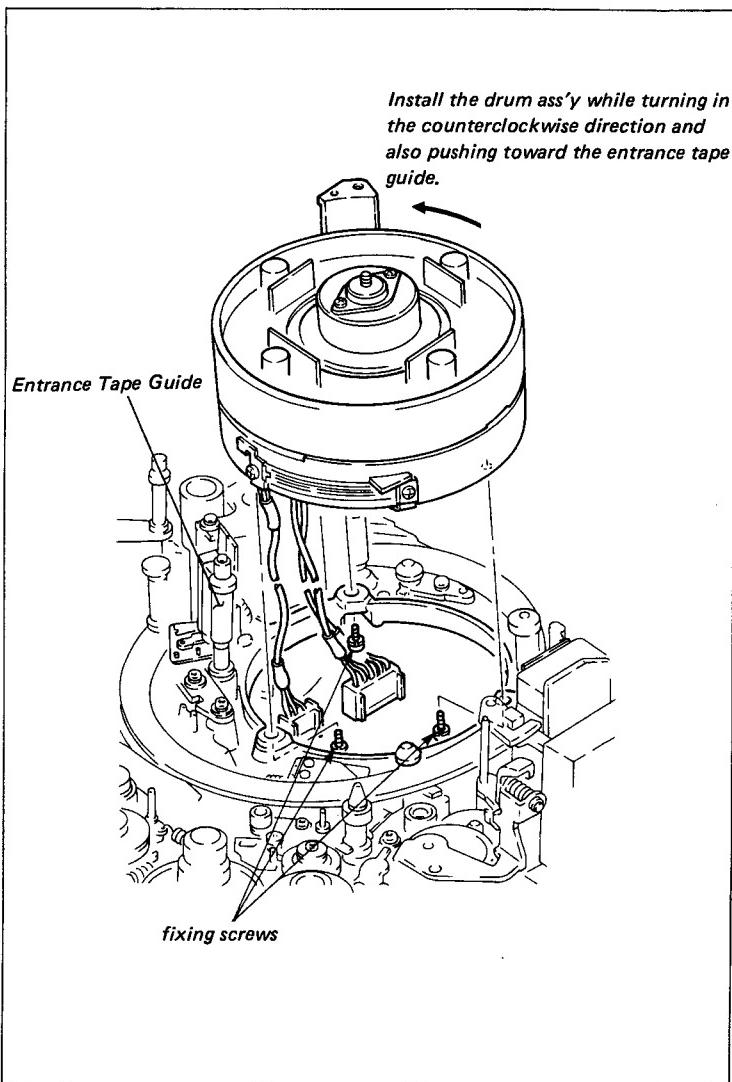
*Upper Drum*



#### 4-6. REPLACEMENT OF THE DRUM ASSEMBLY

##### Replacement procedure:

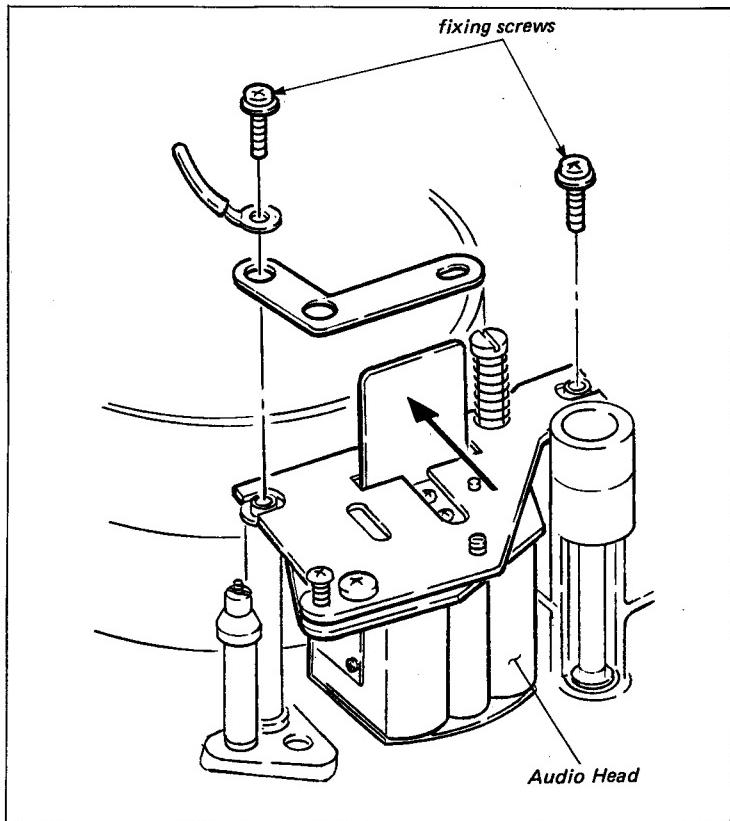
- (1) Remove the fixing screw of the VRA-1 Board, and then open it.
- (2) Remove the CN3 (white) and CN4 (black) on the back of the VRA-1 Board.
- (3) Disconnect the connector from the strip-ring.
- (4) Remove the Battery Case.
- (5) Disconnect the CN10 (red) and CN11 (yellow) from the MB-157 Board.
- (6) Remove the Drum Belt.
- (7) Disconnect the connector from the drum assembly.
- (8) Remove the three fixing screws of the drum assembly from under side of the unit, and then remove the defective drum.
- (9) Thread the harness of CN3 (white) and CN4 (black) through the hole of the chassis.
- (10) Connect the CN10 and CN11 to the MB-157 Board.  
**NOTE:** Secure the drum harness with harness retainers so that the drum harness does not touch the Drum Pulley.
- (11) While turning the drum ass'y in the counterclockwise direction and pushing the drum toward the Entrance Tape Guide, as viewed from top of the unit, install the new drum.
- (12) Install the Drum Belt.  
**NOTE:** The white mark of the Drum Belt should be outside.
- (13) Install the Battery Case.
- (14) Connect the connectors to the VRA-1 Board, and then install the VRA-1 Board to the unit.



#### 4-7. REPLACEMENT OF THE AUDIO HEAD

##### Replacement procedure:

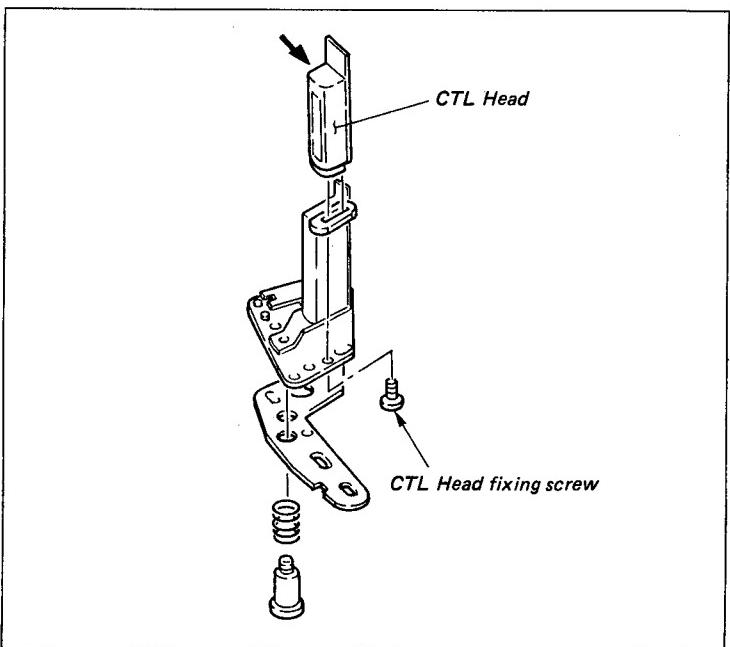
- (1) Remove the fixing screw of the VRA-1 Board, and then open the VRA-1 Board.
- (2) Remove the defective Audio Head Block.
- (3) Disconnect the four connectors from the Audio Head.  
connectors : Board-in connectors (3 pieces)  
TC harness (1 piece)
- (4) Connect the four connectors to the new Audio Head.
- (5) While pushing the Audio Head in the direction of the arrow, install it.
- (6) Install the Audio Head Block to the unit.
- (7) Install the VRA-1 Board.
- (8) Perform the adjustments as described in Section 4-17.



#### 4-8. REPLACEMENT OF THE CTL HEAD

##### Replacement procedure:

- (1) Remove the harness from the CTL Head, and connect it to the new CTL Head.
- (2) Remove the CTL Head Block.
- (3) Remove the fixing screws of the CTL Head.
- (4) Install the new CTL Head to the CTL Head Block while pushing the head in the direction of the arrow.
- (5) Install the CTL Head Block, and then perform the adjustments as described in Section 4-17.



#### 4-9. REPLACEMENT OF THE FULL ERASE HEAD

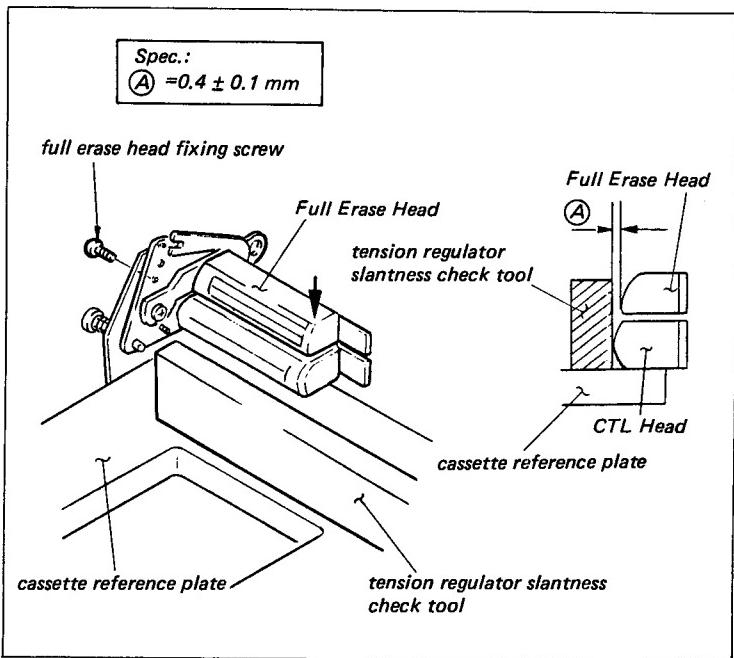
Tool: Cassette reference plate

Tension regulator slantness check tool

Thickness gauge

##### Replacement procedure:

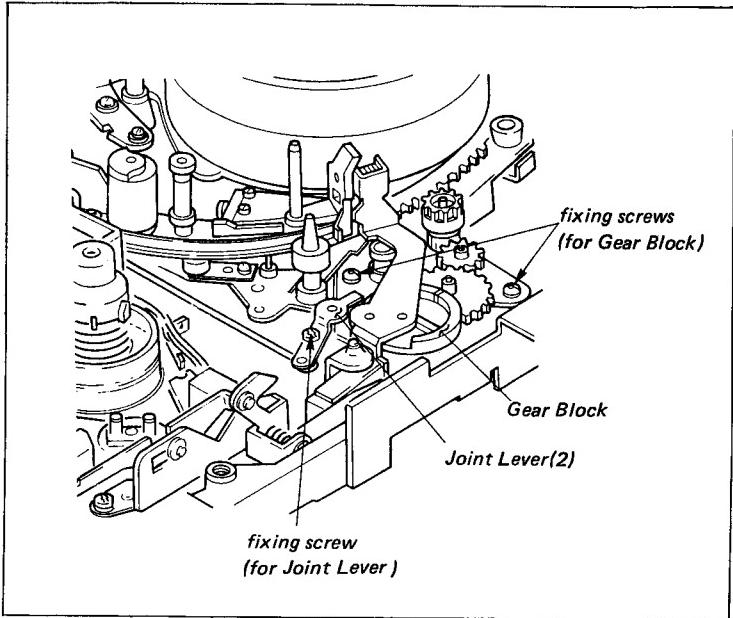
- (1) Unsolder the leads from each board of the CTL Head and Full Erase Head.
- (2) Remove the CTL/Full Erase Head Block.
- (3) Remove the Full Erase Head.
- (4) While pushing the Full Erase Head in the direction of the arrow, install the new one.
- (5) Place the CTL/Full Erase Head Block on the cassette reference plate as shown in the figure. (Place the right side of the CTL Head on the cassette reference plate, and then put the Mounting Plate out of the cassette reference plate.)
- (6) When placing the tension regulator slantness check tool against the CTL Head as shown in the figure, adjust the position of the Full Erase Head so that the clearance between the tool and the Full Erase Head meets the required specification. (Be careful not to scratch the Heads.)
- (7) Arrange the leads.
- (8) Install the CTL/Full Erase Head Block, and perform the adjustments as described in Section 4-17.



#### 4-10. REPLACEMENT OF THE GEAR BLOCK

##### Replacement procedure:

- (1) Remove the fixing screw of the Joint Lever (2).
- (2) Remove the Battery Case.
- (3) Remove the Threading Motor Belt, Pulley Cover and Pulley.
- (4) Remove the two fixing screws of the Gear Block, and then remove the Gear Block.
- (5) Install the new Gear Block.
- (6) Install the Pulley.
- (7) Clean the Threading Motor Belt with a cloth moistened with cleaning fluid, and then install the Threading Motor Belt.
- (8) Install the Pulley Cover.
- (9) Install the Battery Case.
- (10) Tighten the fixing screw of the Joint Lever (2).
- (11) Perform the adjustments as described in Section 4-17.

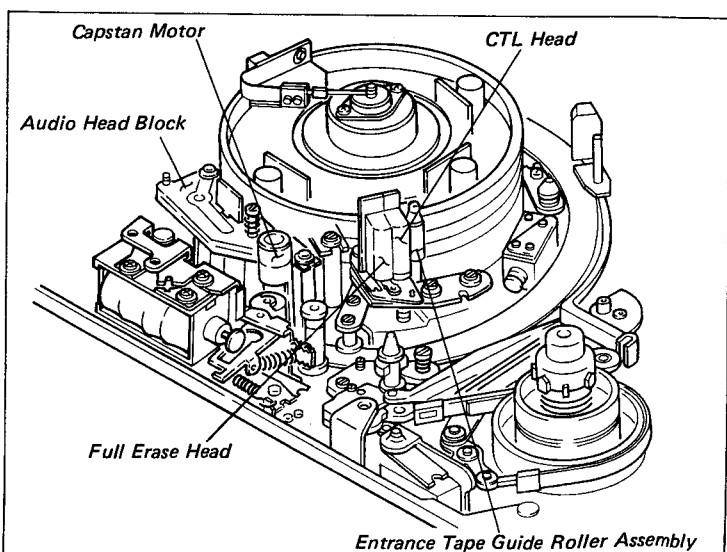


#### 4-11. REPLACEMENT OF THE ENTRANCE TAPE GUIDE ROLLER ASSEMBLY

- The component parts of the Entrance Tape Guide Roller Ass'y cannot be replaced individually since the Entrance Tape Guide Roller Ass'y is prepared as a whole assembly.
- The fixing screw of the Entrance Tape Guide Roller Ass'y can not be removed without removing the Capstan Motor. Therefore, perform the following procedures.

##### Replacement procedure:

- (1) Remove the Audio Head Block.(Refer to Sec. 4-7.)
- (2) Remove the Battery Case.
- (3) Remove the Capstan Motor. (Refer to Sec. 4-7.)
- (4) Remove the fixing screw on the back of the chassis, and then replace the Entrance Tape Guide Roller Ass'y.
- (5) Install the Capstan Motor and the Audio Head Block. (Refer to Sections 4-4 and 4-7.)
- (6) Perform the adjustments as described in Section 4-17.

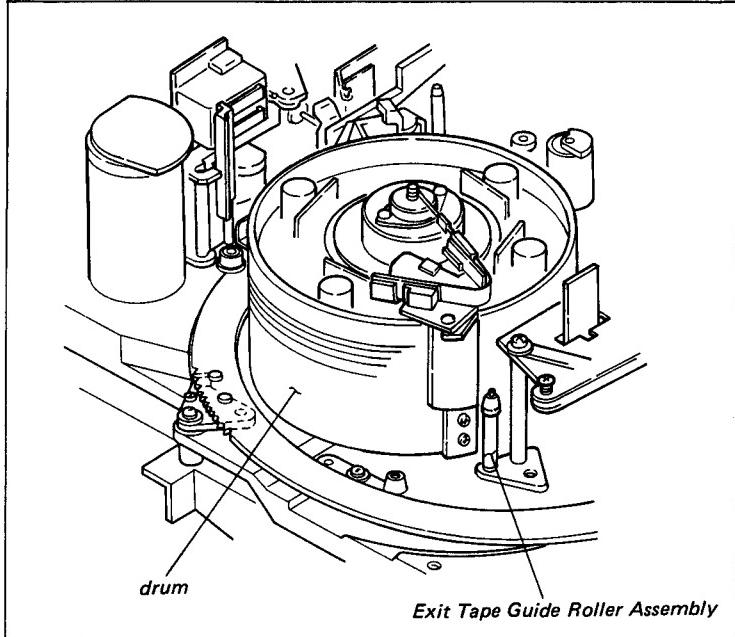


#### 4-12. REPLACEMENT OF THE EXIT TAPE GUIDE ROLLER ASSEMBLY

- The component parts of the Exit Tape Guide Roller Ass'y cannot be replaced individually since the Exit Tape Guide Roller Ass'y is prepared as a whole assembly.

##### Replacement procedure:

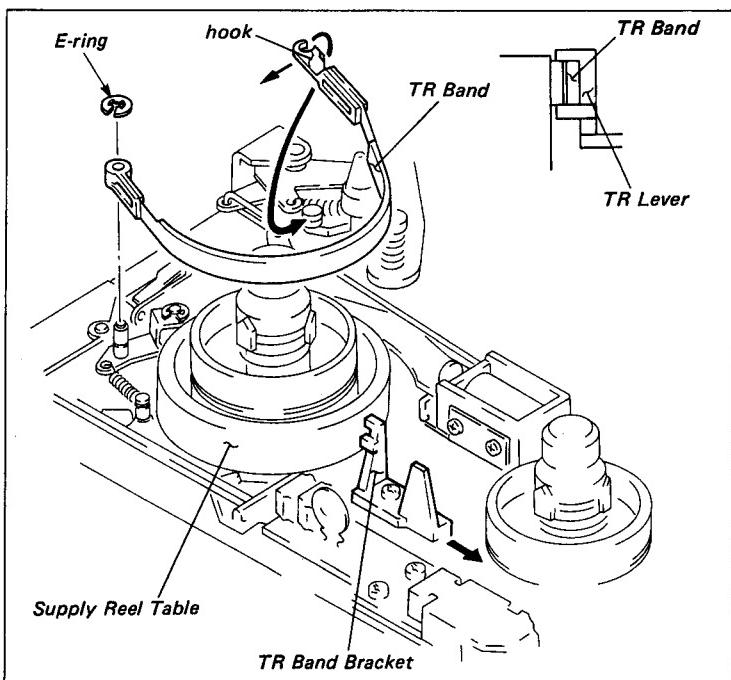
- (1) Remove the Battery Case.
- (2) Remove the fixing screw of the Exit Tape Guide Roller Ass'y on the back of the chassis, and then replace the Exit Tape Guide Roller Ass'y.
- (3) Perform the adjustments as described in Section 4-17.



#### 4-13. REPLACEMENT OF THE TENSION REGULATOR BAND

##### Replacement procedure:

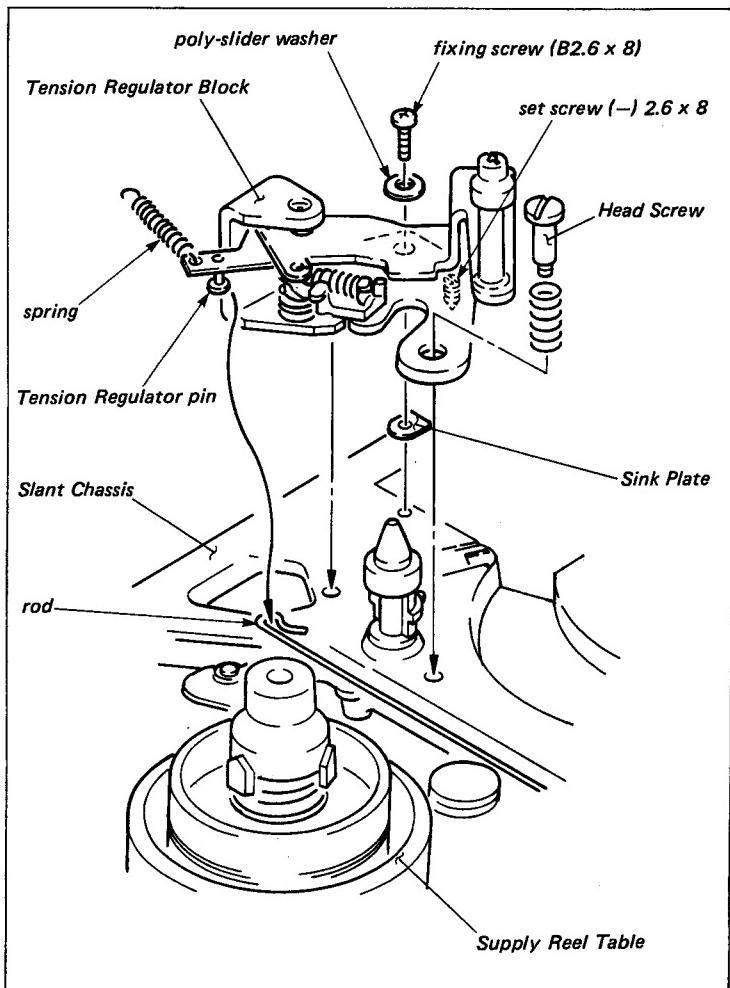
- (1) Loosen the fixing screw of the TR Band Bracket, and then push it in the direction of the arrow.
- (2) Remove the E ring of the TR Band.
- (3) Pull out the hook of the TR Band in the direction of the arrow, and then remove it.
- (4) Clean the Reel Table touching the TR Band.
- (5) Replace the new TR Band. Insert the TR Band between the two claws of the TR Lever as shown in the figure.
- (6) After the replacement, perform the adjustments as described in Section 4-17.



#### 4-14. REPLACEMENT OF THE TENSION REGULATOR BLOCK

##### Replacement procedure:

- (1) Unhook the spring from the Left Side Panel.
- (2) Remove the head screw. (Be sure not to lose the spring.)
- (3) Remove the fixing screw of the Tension Regulator Block.
- (4) Remove the pin of the Tension Regulator Block from the rod, and then remove the Tension Regulator Block. Confirm that the sink plate is inserted to the boss of the slant as shown in the figure.
- (5) Hook the new Tension Regulator Pin to the rod.
- (6) Insert the projection on the bottom of the Tension Regulator into the hole of the chassis, and then screw the fixing screw (B2.6 x 8) about 3 to 4 turns.
- (7) Thread the compression spring through the Head Screw. Install the Tension Regulator Block to the chassis.
- (8) Remove the set screw, (-)2.6 x 6 from the old Tension Regulator Block, and then screw it about 4 to 5 turns into the new block.
- (9) After the replacement, perform the adjustments as described in Section 4-17.



#### 4-15. REPLACEMENT OF THE PINCH ROLLER ASSEMBLY (INCLUDING THE VERTICAL PLAY ADJUSTMENT)

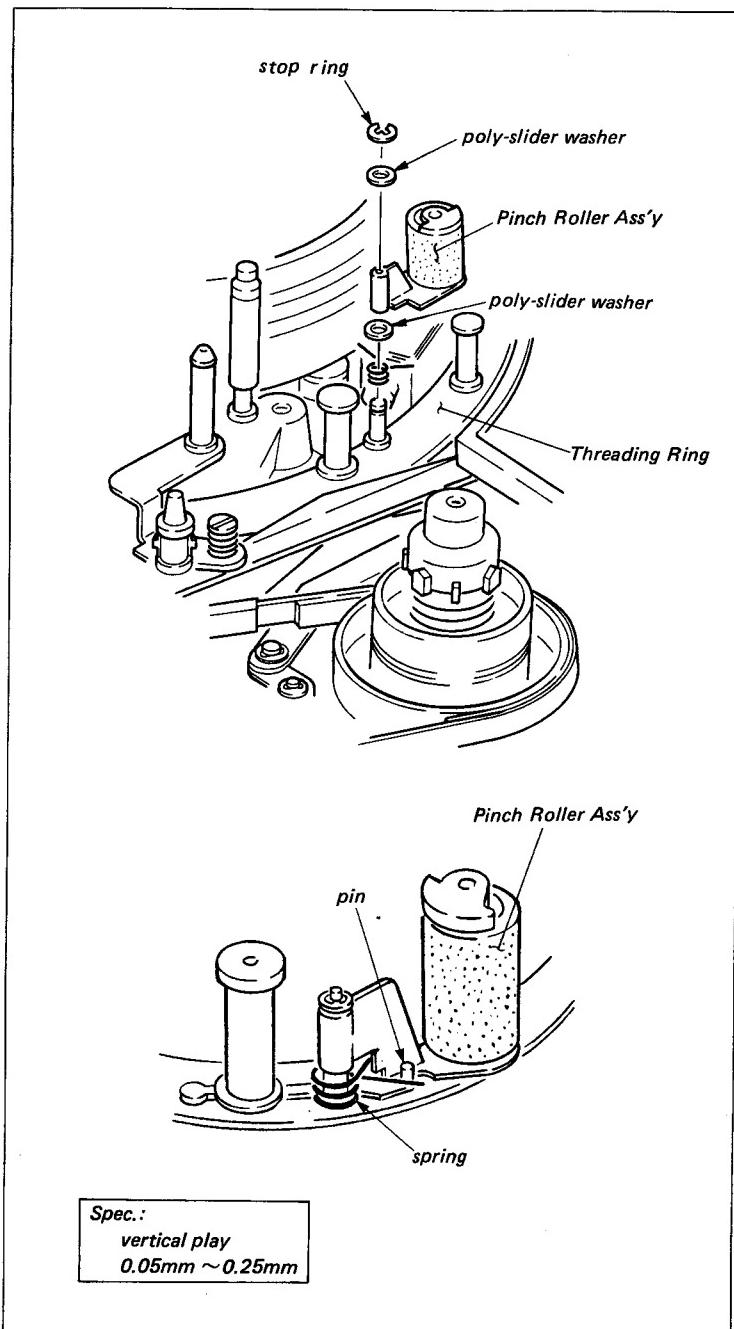
**Tool:** Thickness gauge

**Replacement procedure:**

- (1) Remove the stop ring and the poly-slider washer from the upper portion of the Pinch Roller Ass'y.
- (2) Remove the Pinch Roller Ass'y from the Threading Ring.
- (3) Never remove the poly-slider washer beneath the Pinch Roller Ass'y as shown in the figure.
- (4) Install the new Pinch Roller Ass'y.

**NOTE:** Install the spring so that the short terminal of the spring is positioned to the drum side and the long terminal is positioned to the side of the white plastic pin as shown in the figure.

- (5) Insert the poly-slider washer at the upper portion of the Pinch Roller Ass'y and secure it with a stop ring.
- (6) Push up and down the Pinch Roller Ass'y for inspection. Adjust the poly-slider washer on top of the Pinch Roller Ass'y so that the vertical play meets the required specification.  
Adjustment poly-slider washer;  
3-701-436-01 1.6 mm dia. 0.13 mm thick  
3-701-436-11 1.6 mm dia. 0.25 mm thick  
3-701-436-21 1.6 mm dia. 0.5 mm thick
- (7) Put the unit into the threading completion mode. Perform the Section 5-6-7, Pinch press lever height adjustment. After the replacement, confirm as described in Step (5).
- (8) Perform the adjustments as described in Section 4-17.

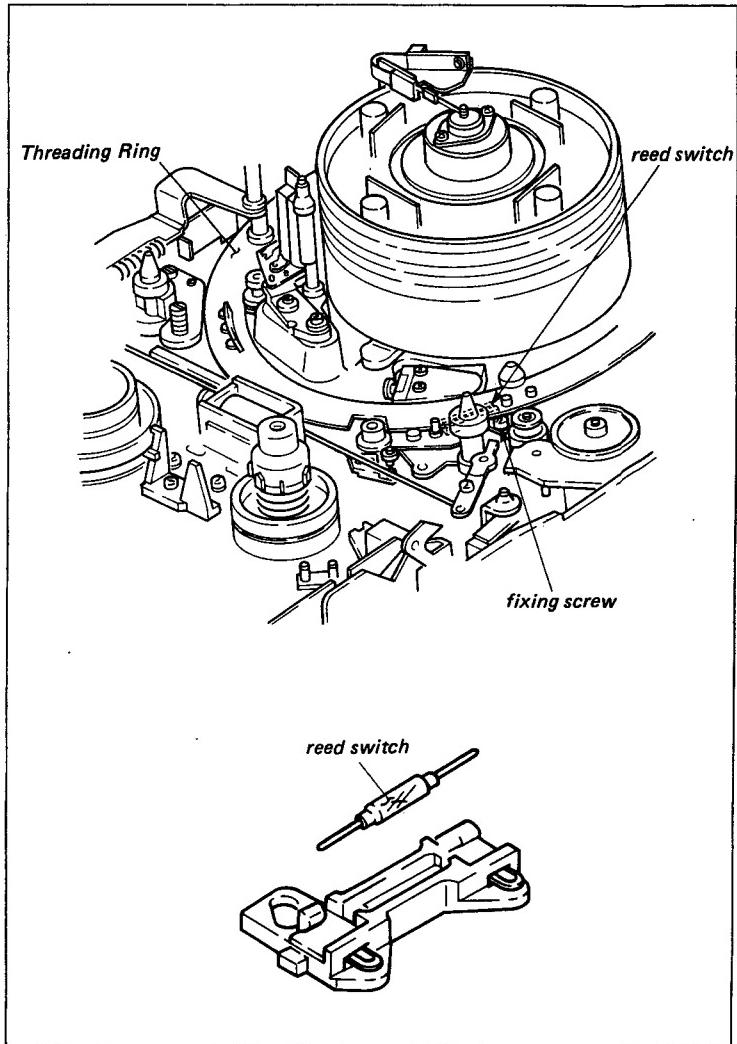


#### 4-16. REPLACEMENT OF THE REED SWITCH

**Mode:** Threading end

**Replacement procedure:**

- (1) Remove the fixing screw, and then remove the Reed Switch Block as shown in the figure.
- (2) Unsolder the Reed Switch, and then replace with new one.  
**NOTE :** Do not apply soldering iron for more than 3 seconds on any one terminal.
- (3) Install the Reed Switch Block on the VTR, and then perform the position adjustment. (Refer to Section 5-2-2.)



#### **4-17. ITEMS TO BE ADJUSTED**

(Numbers in parenthesis refer to Section numbers.)

##### **Replacement of the Reel Motor**

Reel Table Height Adjustment (5-1) → Brake Torque Adjustment (6-1)  
→ FWD Back Tension Adjustment (6-2) → Video Tracking Adjustment  
(7-5) (When the tracking adjustment is performed, adjust referring  
"Adjustment steps of Tracking Adjustment" described in Sec. 7, Alignment  
Information.)

##### **Replacement of the Threading Motor**

Tape Run Adjustment (T Drawer Guide Slantness Adjustment) (7-1-1) →  
Servo System Adjustment

##### **Replacement of the Upper Drum**

Upper Drum Eccentricity Adjustment (4-5) → Video Tracking Adjustment  
(7-5) (When the tracking adjustment is performed, adjust referring "Ad-  
justment Steps of Tracking Adjustment" described in Sec. 7, Alignment  
Information.) → Video Head Dihedral Adjustment (7-14) → CTL Head  
Position Adjustment (7-7) → TC Head Position Adjustment (7-13) →  
Switching Position Adjustment (7-16) → Video System Adjustment

##### **Replacement of the Drum Assembly**

Servo System Adjustment → Adjust referring "Adjustment Steps of  
Tracking Adjustment" described in Sec. 7, Alignment Information → Video  
System Adjustment

##### **Replacement of the Drum Motor**

Servo System Adjustment

##### **Replacement of the Capstan Motor**

Thread End Position Adjustment (5-5-3) → Stopper Arm B Position  
Adjustment (5-5-4) → Thread End Switch Position Adjustment (5-5-5)  
→ Pinch Press Mechanism Block Position Adjustment (5-6-6)  
→ Tape Run Adjustment Around Pinch Roller (7-1-2) → Video  
Tracking Adjustment (7-5) (When the tracking adjustment is performed, adjust  
referring "Adjustment Steps of Tracking Adjustment" described in Sec. 7,  
Alignment Information.) → Servo System Adjustment

##### **Replacement of the Audio/TC Head**

Audio/TC Head Zenith Adjustment (7-4) → Audio Head Height Adjust-  
ment (7-10) → Audio Head Phase Adjustment (7-12) → Audio/TC Head  
Zenith Adjustment (7-4) → Video Tracking Adjustment (7-5) (When the  
tracking adjustment is performed, adjust referring "Adjustment steps of  
Tracking Adjustment" described in Sec. 7, Alignment Information.) → TC  
Head Position Adjustment (7-13) → Audio System Adjustment → Time  
Code System Adjustment

**Replacement of the CTL Head**

CTL Head Zenith/Azimuth Adjustment (7-2) → CTL Head Height Adjustment (7-6) → Video Tracking Adjustment (7-5) (When the tracking adjustment is performed, adjust referring "Adjustment Steps of Tracking Adjustment" described in Sec. 7, Alignment Information.) → CTL Head Position Adjustment (7-7) → TC Head Position Adjustment (7-13)

**Replacement of the Full Erase Head**

Full Erase Head Zenith Adjustment (7-3) → CTL Head Zenith/Azimuth Adjustment (7-2) → CTL Head Height Adjustment (7-6) → Video Tracking Adjustment (7-5) (When the tracking Adjustment" described in Sec. 7, Alignment Information.) → CTL Head Position Adjustment (7-7) → TC Head Position Adjustment (7-13) → Audio System Adjustment

**Replacement of the Gear Block**

Gear Block Position Adjustment (5-5-1) → Joint Lever (2) Position Adjustment (5-4-3)

**Replacement of the Entrance Roller Guide Ass'y/Exit Roller Guide Ass'y**

Adjust referring "Adjustment Steps of Tracking Adjustment" described in Sec. 7, Alignment Information.

**Replacement of the Tension Regulator Band**

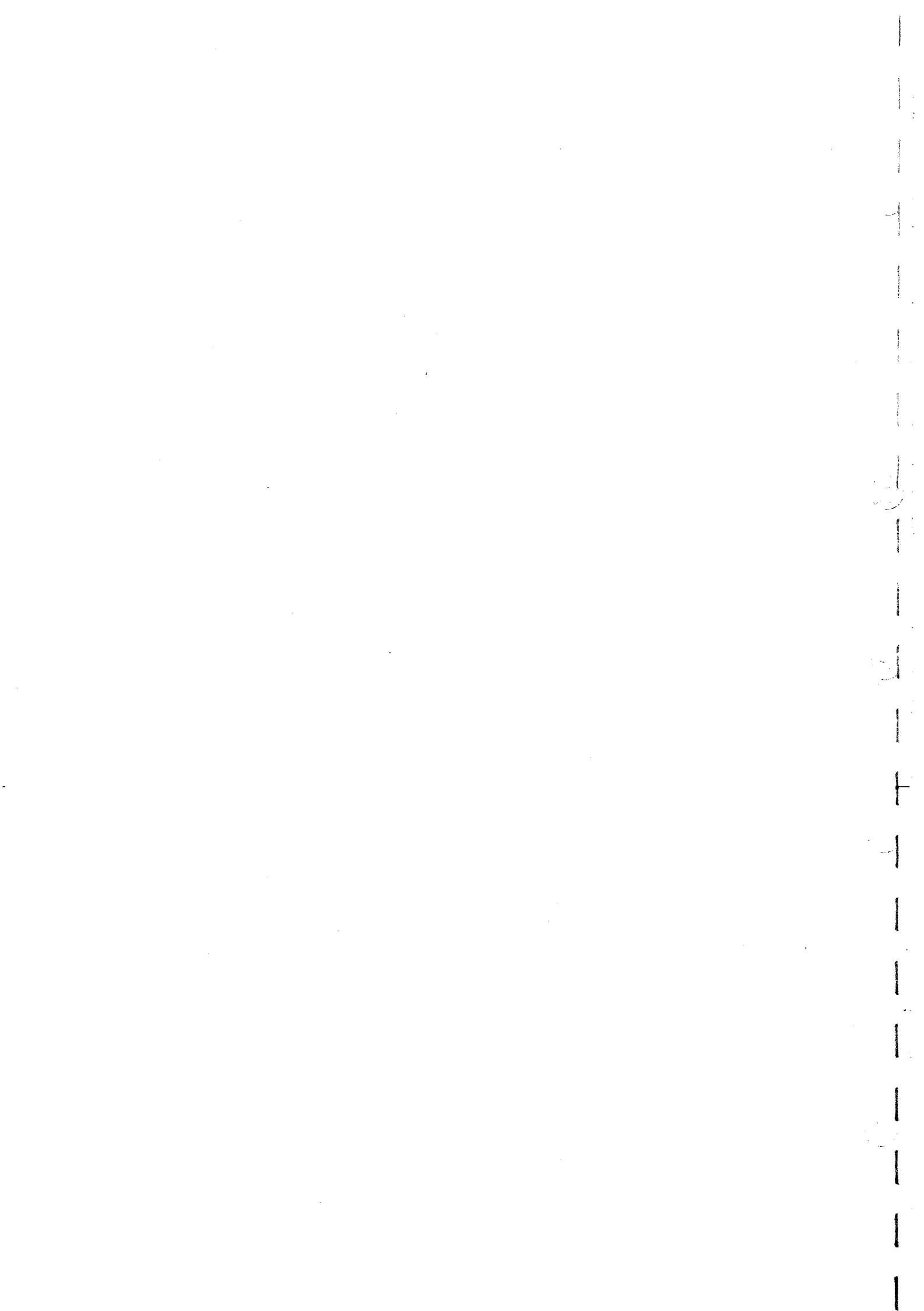
Tension Regulator Operation Position Adjustment (5-4-2) → Tape End Sensor Position Adjustment (5-3-3) → Joint Lever (2) Position Adjustment (5-4-3) → Reed Switch Position Adjustment for Tension Regulator (5-2-2) → FWD Back Tension Adjustment (6-2)

**Replacement of the Tension Regulator Block**

Tension Regulator Slantness Adjustment (5-4-1) → Gear Block Position Adjustment (5-5-1) → Tension Regulator Operating Position Adjustment for (5-4-2) → Tape End Sensor Position Adjustment (5-3-3) → Joint Lever (2) Position Adjustment (5-4-3) → Reed Switch Position Adjustment for Tension Regulator (5-2-2) → FWD Back Tension Adjustment (6-2) → Video Tracking Adjustment (7-5) → Adjust referring "Adjustment Steps of Tracking Adjustment" described in Sec. 7, Alignment Information.

**Replacement of the Pinch Roller**

Thread End Position Adjustment (5-5-3) → Stopper Arm B Position Adjustment (5-5-4) → Thread End Switch Position Adjustment (5-5-5) → Pinch Press Mechanism Block Position Adjustment (5-6-6) → Tape Run Adjustment Around Pinch Roller (7-1-2)



## SECTION 5

### LINK AND DRIVE SYSTEM ALIGNMENT

#### ALIGNMENT INFORMATION

##### MODE

- **Unthreading end mode**

It means EJECT completion mode.

The threading guide, tension regulator arm and pinch roller are put back at the cassette tape side completely.

- **How to put the unit into the unthreading end mode.**

Push the EJECT button in the threading end mode.

- **Threading mode**

Push the cassette-in switch and rotate the threading ring. Threading mode means that this threading ring is rotating.

- **Threading end mode**

Keep pressing the cassette-in switch. The threading ring rotates in the counterclockwise direction, and then stops rotation.

This state means the threading end mode.

- **PLAY mode without a cassette tape**

(1) Keep pressing the cassette-in switch till the threading ring rotation is stopped.

(2) Remove a finger from the cassette in switch, and then push the PLAY button. This state means the PLAY mode without a cassette tape.

#### HOW TO MAKE THE CASSETTE TAPE WITHOUT A LID

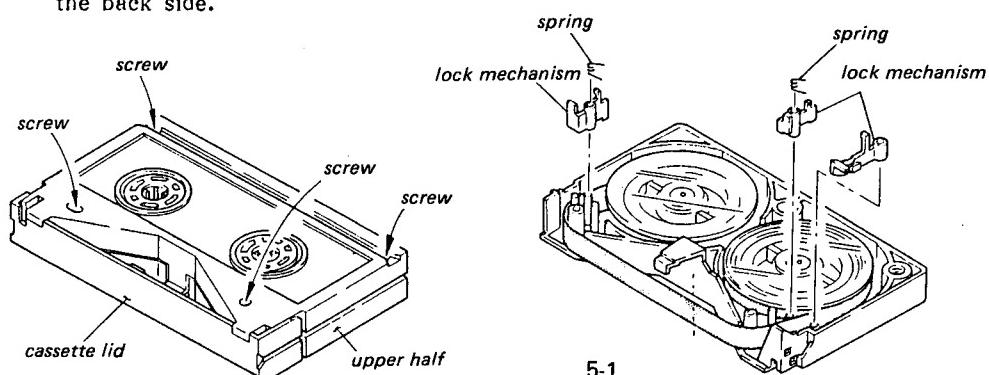
Since the VTR is designed compact size, the check and adjustment cannot be performed if cassette tape lid is installed.

(1) Remove the four screws on the back of the cassette as shown in the figure, and remove the upper half of the cassette.

(2) Remove the lock mechanism parts and the springs on the left and right.

(3) Remove the cassette lid from the upper half.

(4) Install the upper half on the lower half with four screws from the back side.



## 5-1. REEL TABLE HEIGHT ADJUSTMENT

- Adjust the Reel Table so that the height of the Take-up and the Supply Reel Tables are 0.375 mm higher than the adjusted position by the limit gauge of the cassette reference plate, proper tape path can then be obtained.
- Be sure to perform the procedure (3) in this adjustment.

Mode: Unthreading end

Tool: Cassette reference plate

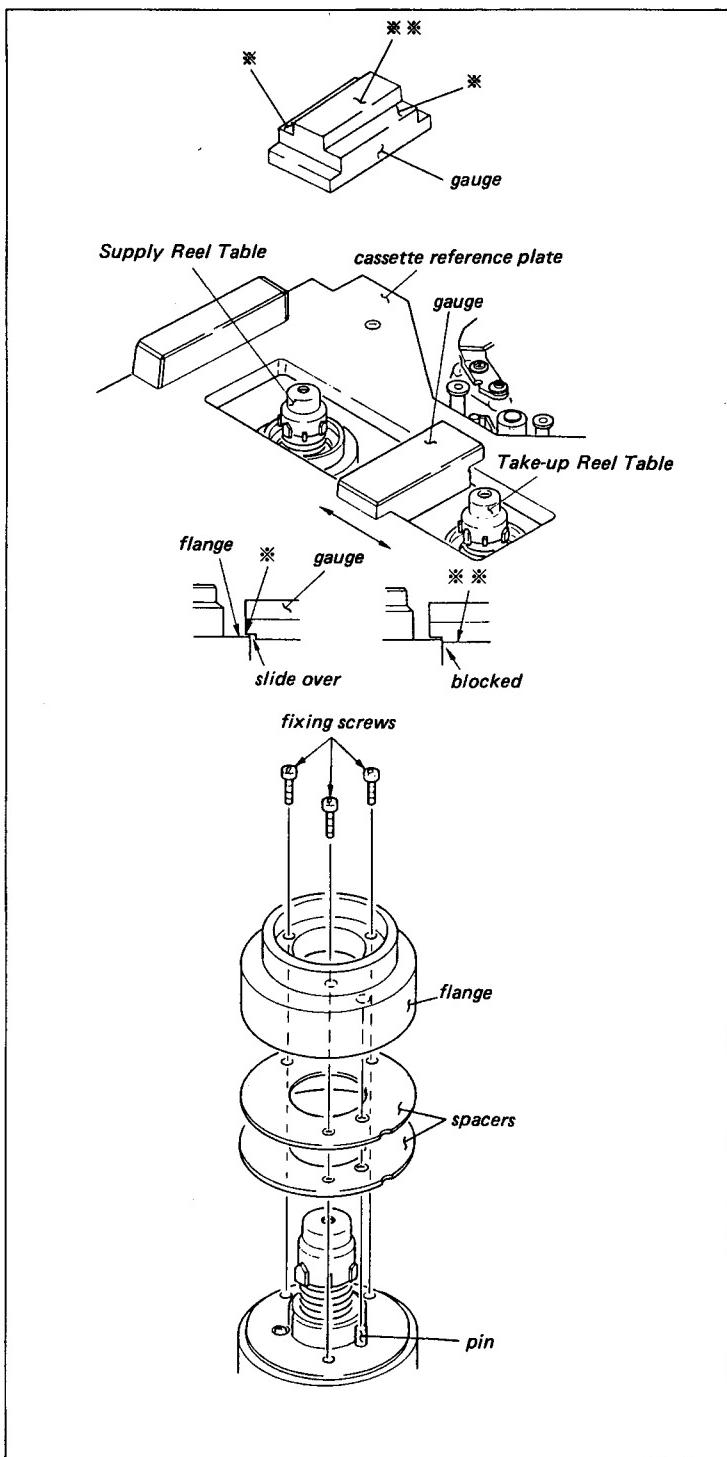
### Adjustment procedure:

- (1) Put the Cassette Reference Plate in the cassette position.
- (2) Move the gauge as shown in the figure. Check that the \* marked portion of the gauge can slide over the Reel Table, while the \*\* marked portion is blocked, and cannot slide over Reel Table. (Check the height turning the Reel Table by hand.) If does not meet the required specification, remove the three fixing screws of flange and adjust the height of the Reel Table by varying the number of the spacers under the flange.

Note : . When inserting the spacers, put the hole of the flange and the pin on the Reel Table together.

- . When checking the height, tighten the flange with three screws.

- (3) After completion of Step (2), insert a 0.125 mm and 0.25 mm thick spacers under the flange of the Supply and Take-up Reel Tables.
- (4) Tighten the flange with three screws.
  - . The spacer for adjustment:  
0.125 mm thick : 2-621-040-01  
0.25 mm thick : 2-621-040-11



## 5-2. SWITCH POSITION ADJUSTMENT

### 5-2-1. Cassette-up Compartment Unlock Switch Position Adjustment

**Mode:** Unthreading end

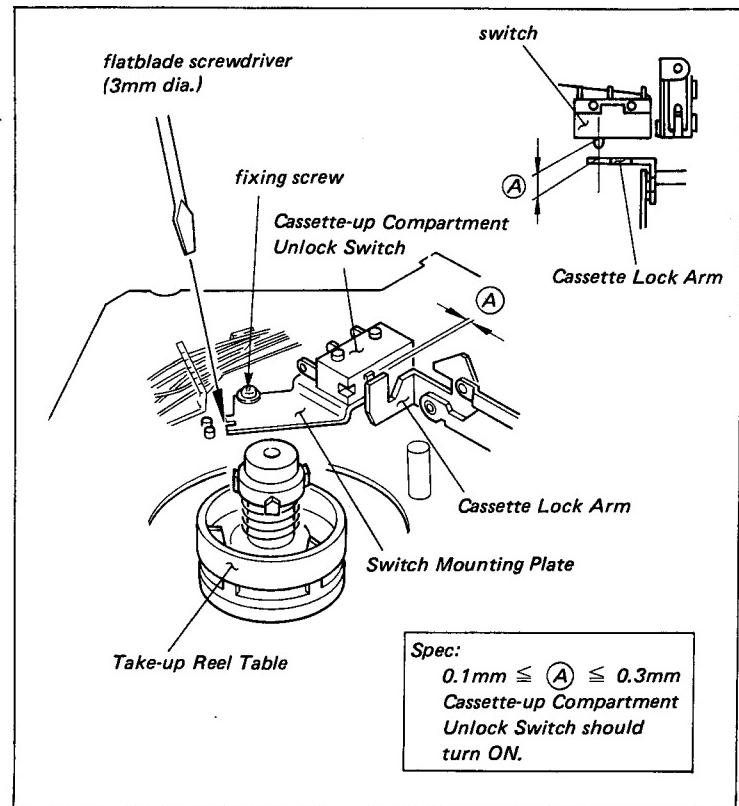
**Tool:** Thickness gauge (0.1 mm and 0.3 mm thick)

**Check procedure:**

- (1) Check that the clearance between the Cassette-up Compartment Unlock Switch and the Cassette Lock Arm meets the required specification.

**Adjustment procedure:**

- (1) Loosen the fixing screw of Switch Mounting Plate about 1/4 to 1/2 turn.
- (2) Adjust the position of the Switch Mounting Plate with a flatblade screwdriver (3 mm dia.) to meet the required specification.



## 5-2-2. Reed Switch Position Adjustment for Tension Regulator

**Mode:** Threading end (POWER OFF)

**Tool:** Thickness gauge (2 mm and 2.5 mm thick)

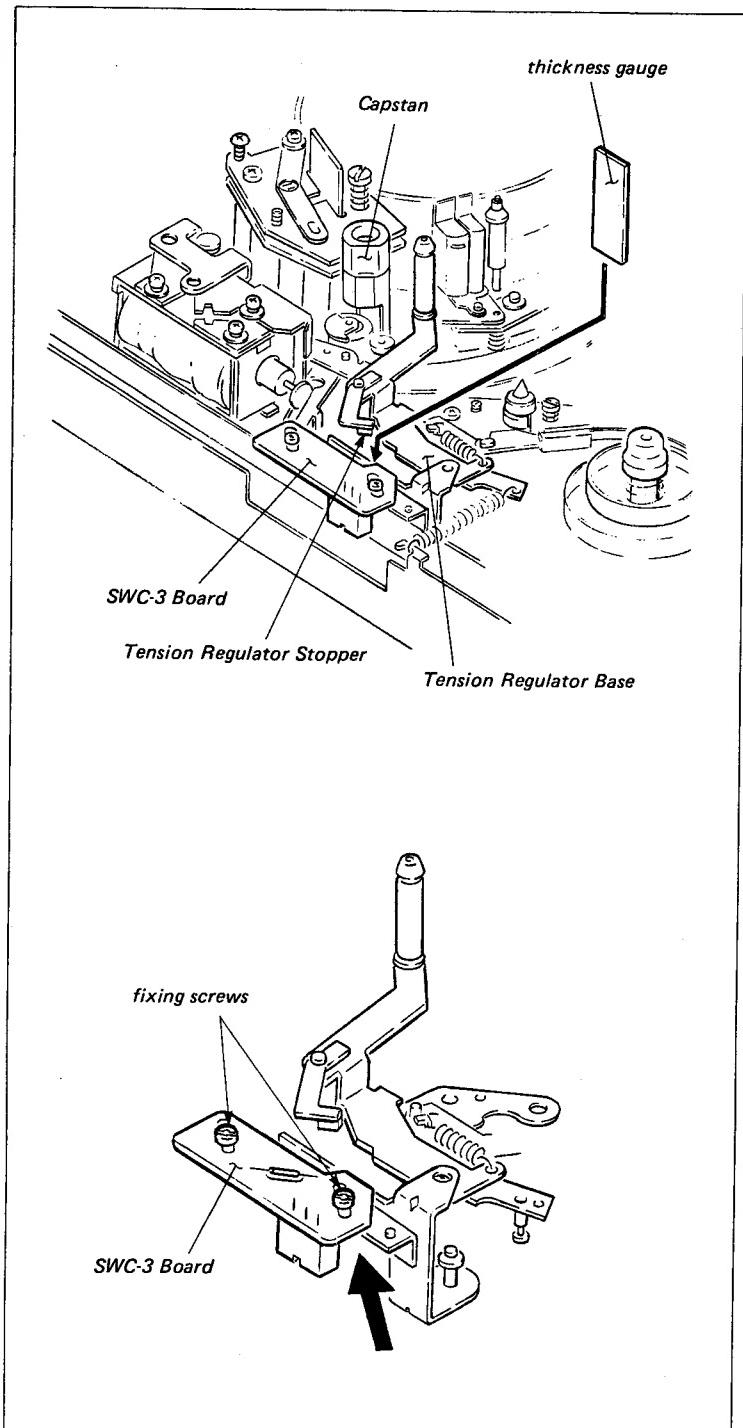
Circuit tester

**Check procedure:**

- (1) Put the unit into the threading end mode, then turn the power off.
- (2) Remove the two fixing screws on the SV-94P Board, and then open the SV-94P Board.
- (3) Connect the circuit tester to pin 1 and pin 3 of the connector CN31 on the SWC-3 Board.
- (4) Insert the thickness gauge (2 mm thick) between the Tension Regulator Base and the Tension Regulator Stopper.
- (5) Check that the circuit tester indicates "H".
- (6) Insert the thickness gauge (2.5 mm thick) between the Tension Regulator Base and the Tension Regulator Stopper.
- (7) Check that the circuit tester indicates "L".
- (8) Remove the thickness gauge, and push the Tension Regulator Base to the Tension Regulator Stopper as far as it will go.
- (9) Check that the circuit tester indicates "H".

**Adjustment procedure:**

- (1) Loosen the two fixing screws of the SWC-3 Board about 1/2 to 3/4 turn.
- (2) Move the SWC-3 Board in the direction of the arrow by hand so that the position meets the required specification.



### 5-3. TAPE SENSOR POSITION ADJUSTMENT

#### 5-3-1. Tape Beginning Sensor Position Adjustment (1)

**Mode:** Unthreading end (POWER OFF)

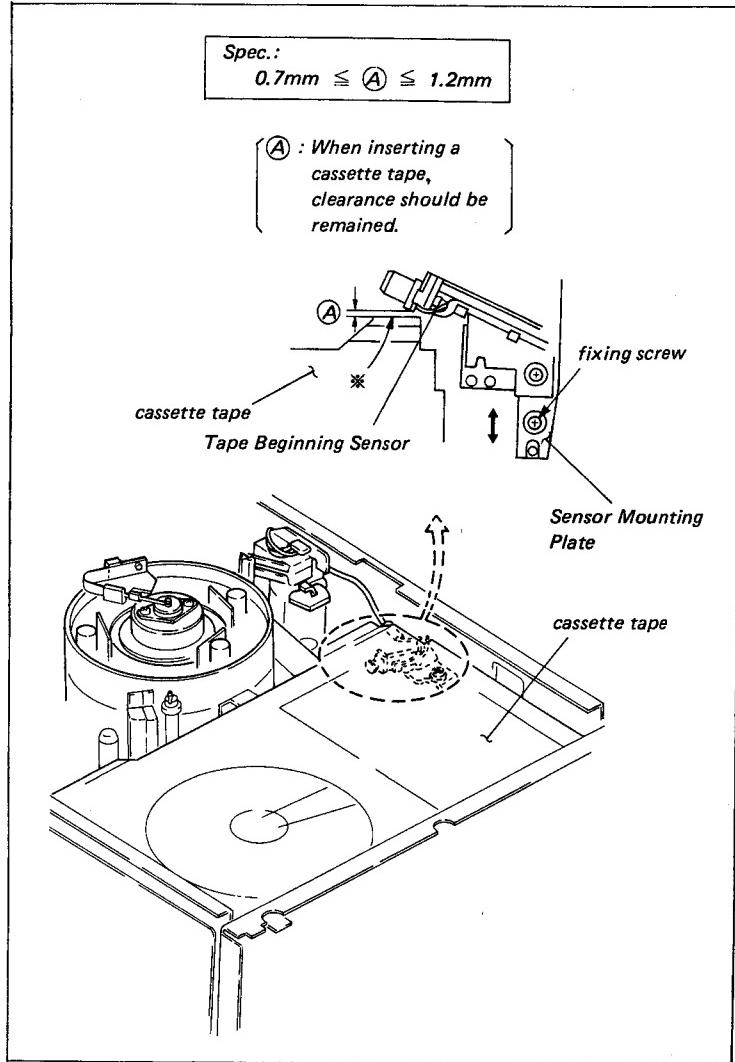
**Tool:** Cassette tape without a lid

**Check procedure:**

- (1) Insert the cassette tape. Check that the clearance between the \* marked portion of the cassette tape and the printed circuit board of sensor meets the required specification.

**Adjustment procedure:**

- (1) Loosen the fixing screw of Sensor Mounting Plate about 1 turn.
- (2) Adjust the position of the Sensor Mounting Plate by hand so that it meets the required specification.
- (3) After adjustment, perform the Section 5-3-2, Tape beginning sensor position adjustment (2).



### 5-3-2. Tape Beginning Sensor Position Adjustment (2)

- It is required that the Section 5-3-1, Tape beginning sensor position adjustment (1) is correct before initiating this adjustment.

**Mode:** PLAY

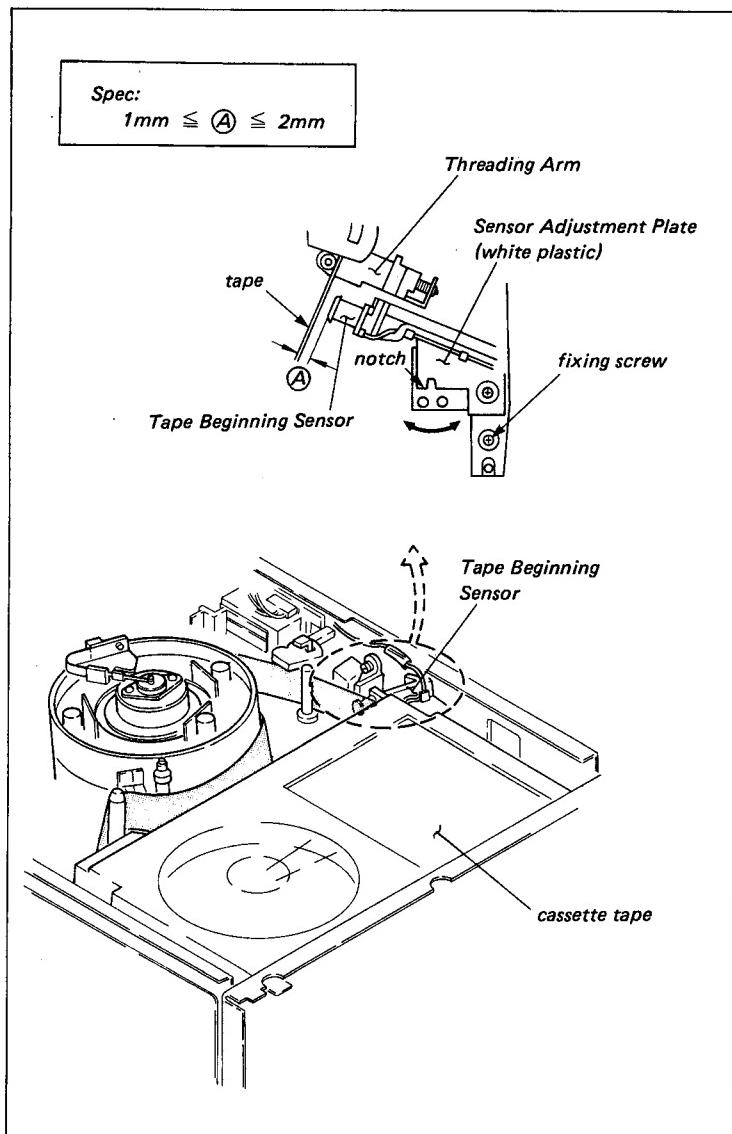
**Tool:** Cassette tape without a lid

**Check procedure:**

- Insert a cassette tape (use the beginning portion of the tape) and put into the PLAY mode.
- Check that the clearance between the tape and the Tape Beginning Sensor meets the required specification.
- Repeat the unthreading and threading modes two or three times and check that the Threading Arm does not hit against the Tape Beginning Sensor in the threading mode.

**Adjustment procedure:**

- Loosen the fixing screw of the Sensor Adjustment Plate about 1/4 to 1/2 turn.
- Insert a flatblade screwdriver (2 mm dia.) into the notch of the Adjustment Plate. Adjust the position of the Sensor Adjustment Plate so that it meets the required specification.
- Confirm as described in the check procedure (3).



### 5-3-3. Tape End Sensor Position Adjustment

Mode: PLAY

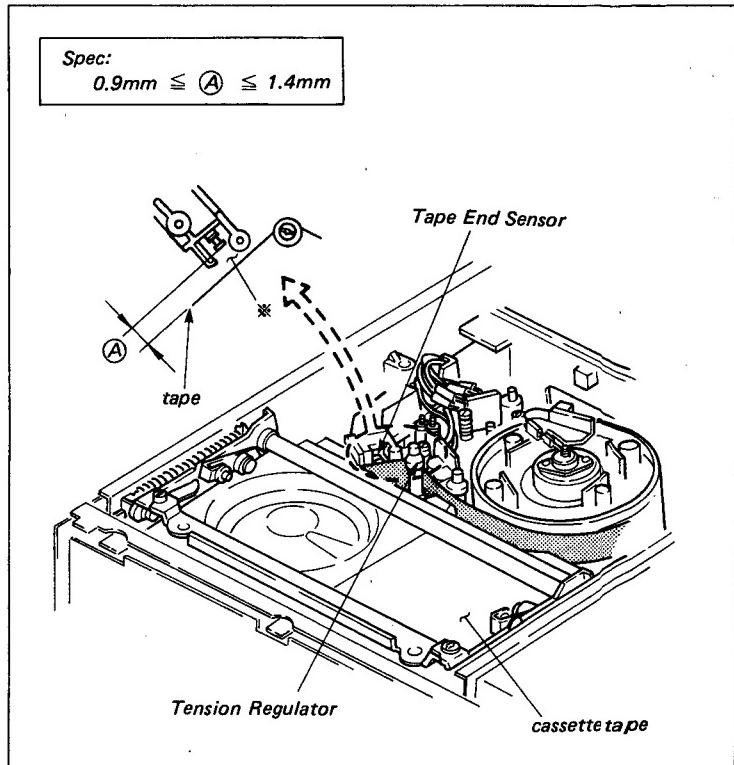
Tool: Cassette tape without a lid

Check procedure:

- (1) Insert the cassette tape (use the beginning portion of the tape) and put into the PLAY mode.
- (2) Check that the clearance between the tape and the \* marked portion of the Tape End Sensor meets the required specification.

Adjustment procedure:

- (1) Loosen the fixing screw of the End Sensor Block about 1/2 turn. Adjust the position of the Tape End Sensor block by hand so that it meets the required position.



## 5-4. TENSION REGULATOR SYSTEM ADJUSTMENT

### 5-4-1. Tension Regulator Slantness Adjustment

- This adjustment is closely related with the video tracking adjustment.
- Perform the video tracking adjustment after this adjustment.

**Mode:** PLAY mode without a cassette tape

**Tool:** Cassette reference plate

Tension regulator slantness check tool

Alligator clip

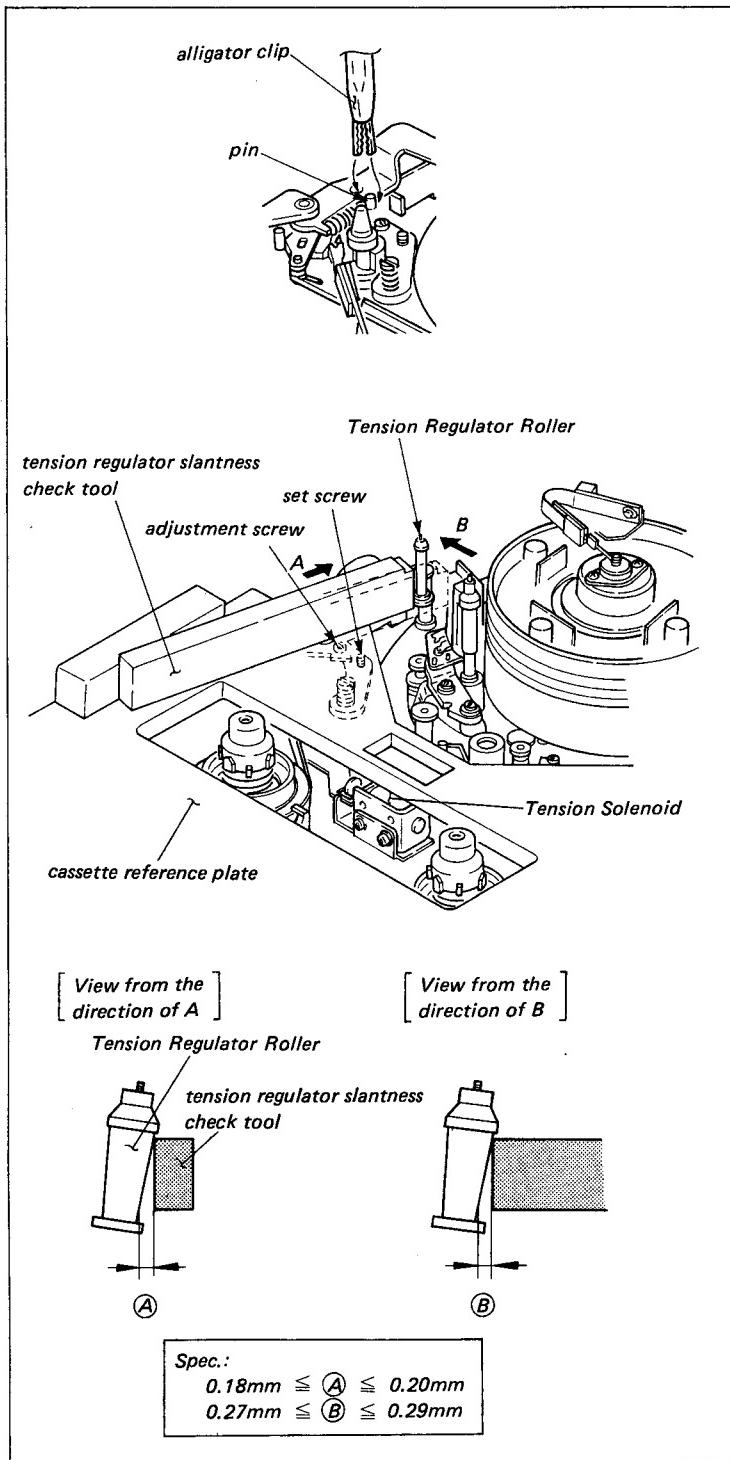
**Check procedure:**

- Put the unit into the PLAY mode without a cassette tape, and then turn the power of AC adaptor OFF.
- Push the Tension Regulator Arm against the S-Reel Table. Clip the Tension Regulator Arm with an alligator clip.

**Note:** Crush the tip of the alligator clip with pliers.

Check that there is no clearance between the black plastic pin and the Tension Regulator Arm. (Check that the Tension Regulator Band is strained.)

- Install the Cassette Reference Plate on the cassette position.
- Place the Tension Regulator Slantness Check Tool against the Tension Regulator Roller from the direction of the arrows A and B. Check that the slantness of the roller meets the required specification.



**Adjustment procedure:**

- When the slantness is incorrect viewing from the direction of the arrow B;
  - (1) Adjust the slantness with the set screw.
- When the slantness is incorrect viewing from the direction of the arrow A;
  - (2) Adjust the slantness with the adjustment screw.
- (3) Confirm as described in the check procedure (4).
- (4) After adjustment, perform the following adjustments;
  - Section 5-4-2. Tension regulator operating position adjustment
  - Section 5-5-1. Gear block position adjustment
  - Section 5-4-3. Joint lever (2) position adjustment
  - Section 7-5. Video tracking adjustment

#### 5-4-2. Tension Regulator Operating Position Adjustment

- It is required that the Section 5-4-1, Tension regulator slantness adjustment, and Section 5-5-1, Gear block position adjustment are correct before initiating this adjustment.
- Take care in adjustment as the drum will rotate.

**Mode:** PLAY mode without a cassette tape

**Tool:** Slide vernier calliper or equivalent

Alligator clip

**Check procedure:**

- Clip the Tension Regulator Arm and the pin with alligator clip as shown in the figure.
- Check that the distance between the Flanges of the Entrance Guide and the Tension Regulator Roller meets the required specification.

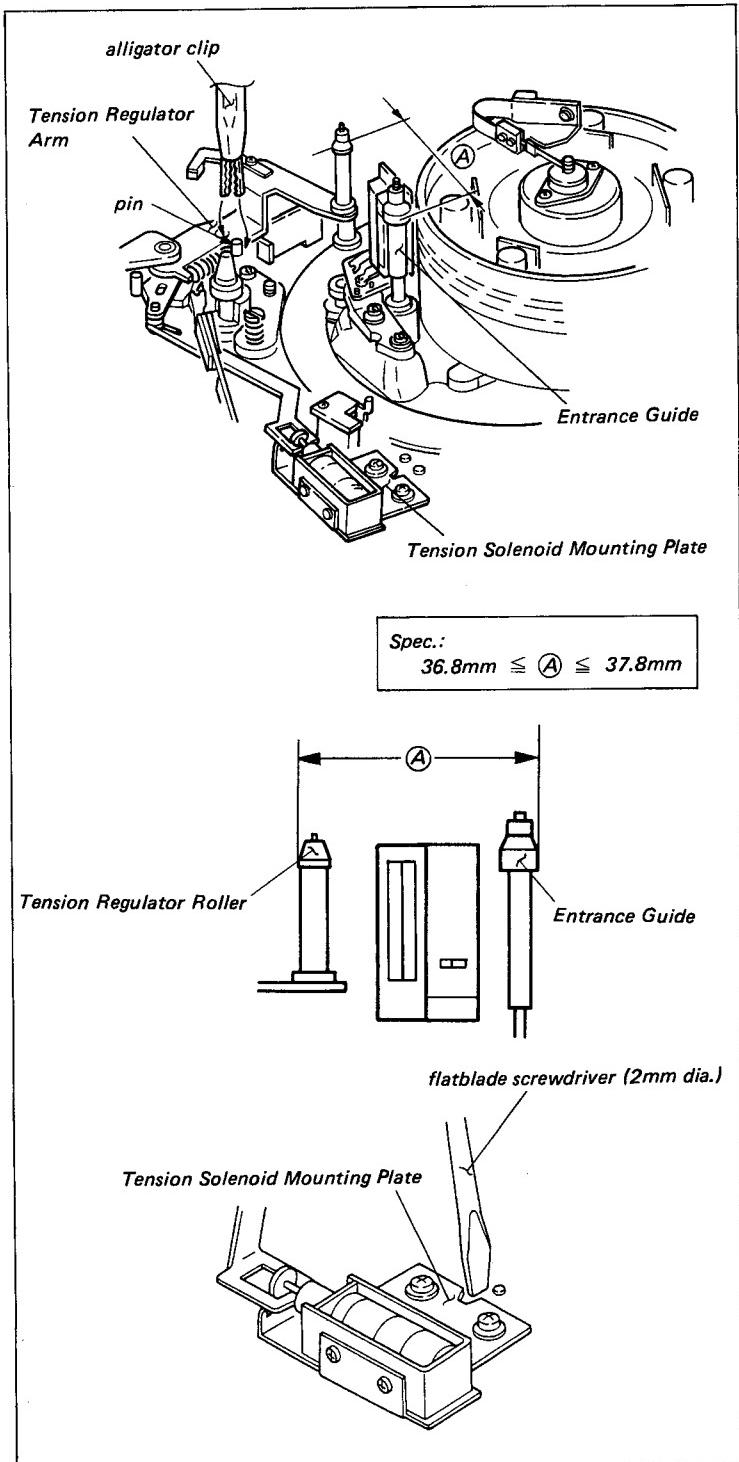
**Adjustment procedure:**

- Loosen the two fixing screws of the Tension Solenoid Mounting Plate about 1/3 to 1/2 turn.
- Adjust the position of the Tension Solenoid Mounting Plate with a flat-blade screwdriver (2 mm dia.) so that it meets the required specification.

**Note:** When turn a flatblade screwdriver (2 mm dia.) in a clockwise direction, the clearance between the Tension Regulator Roller and the Entrance Guide become narrow.

When turn a flatblade screwdriver (2 mm dia.) in a counter-clockwise direction, the clearance between the Tension Regulator Roller and the Entrance Guide become wide.

- After adjustment, perform the following adjustments;
  - Section 5-3-3. Tape end sensor position adjustment
  - Section 5-4-3. Joint lever (2) position adjustment.



### 5-4-3. Joint Lever (2) Position Adjustment

. It is required that the Section 5-4-1, Tension regulator slantness adjustment, Section 5-4-2, Tension regulator operating position adjustment, and Section 5-5-1, Gear block position adjustment are correct before initiating this adjustment.

**Mode:** Threading end/Unthreading end

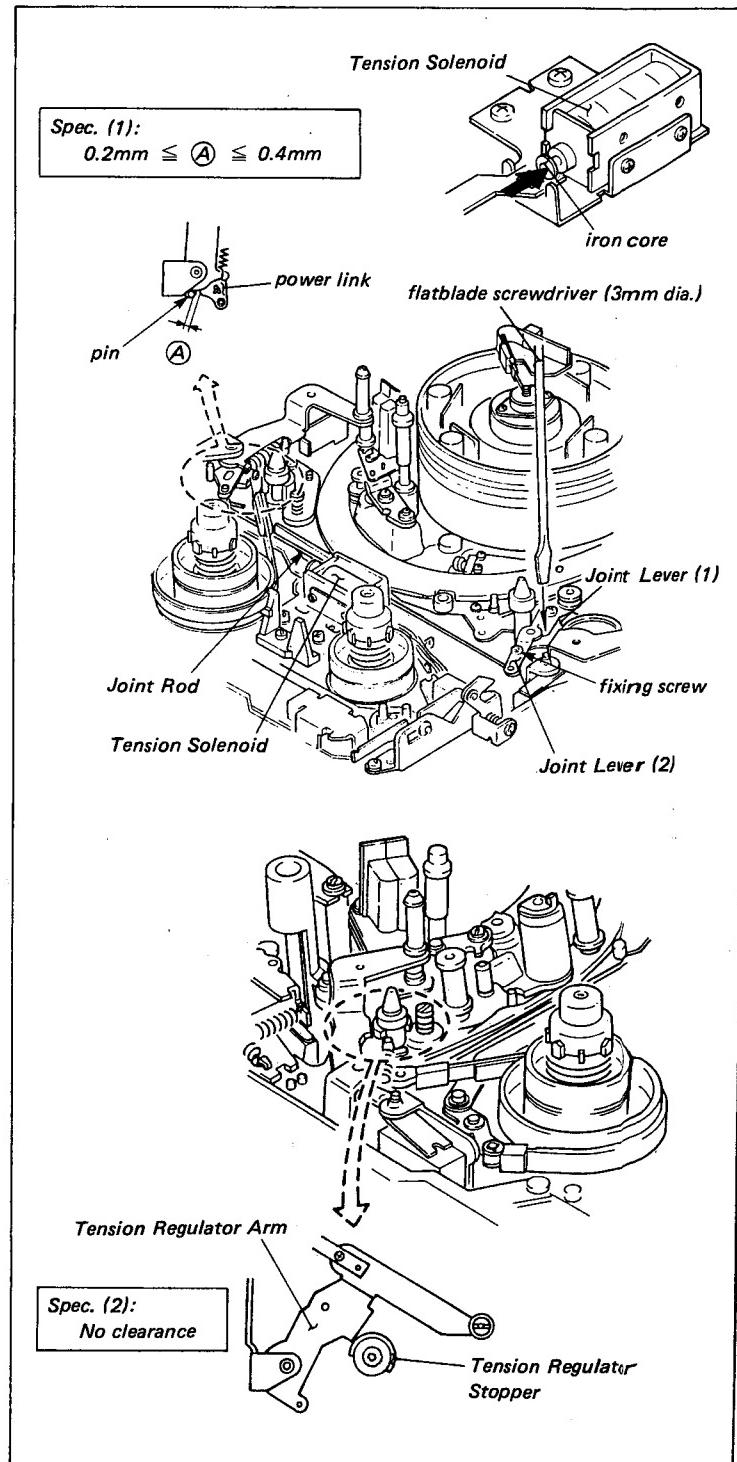
**Tool:** Wire clearance gauge

**Check procedure:**

- (1) Put the unit into the threading end mode.
- (2) Move the iron core of the Tension Solenoid into the fully energized position as far as it will go. Check that the clearance between the Power Link and the pin of the Tension Regulator Arm meets the required specification (1).
- (3) Put the unit into the unthreading end state.
- (4) Check that the Tension Regulator Arm contacts with the Tension Regulator Stopper. (Spec.2)

**Adjustment procedure:**

- (1) Loosen the fixing screw of the Joint Lever (2) about 1/4 to 1/2 turn.
- (2) Insert a flatblade screwdriver (3 mm dia.) between the Joint Lever (1) and (2). Adjust the position of the Joint Lever (2) so that it meets the required specification (1).
- (3) Check the spec.2. If the position of the Joint Lever (2) is incorrect, adjust the position of it within the limits of the spec.1 .



## 5-5. THREADING SYSTEM ADJUSTMENT

### 5-5-1. Gear Block Position Adjustment

**Mode:** Unthreading end/Threading

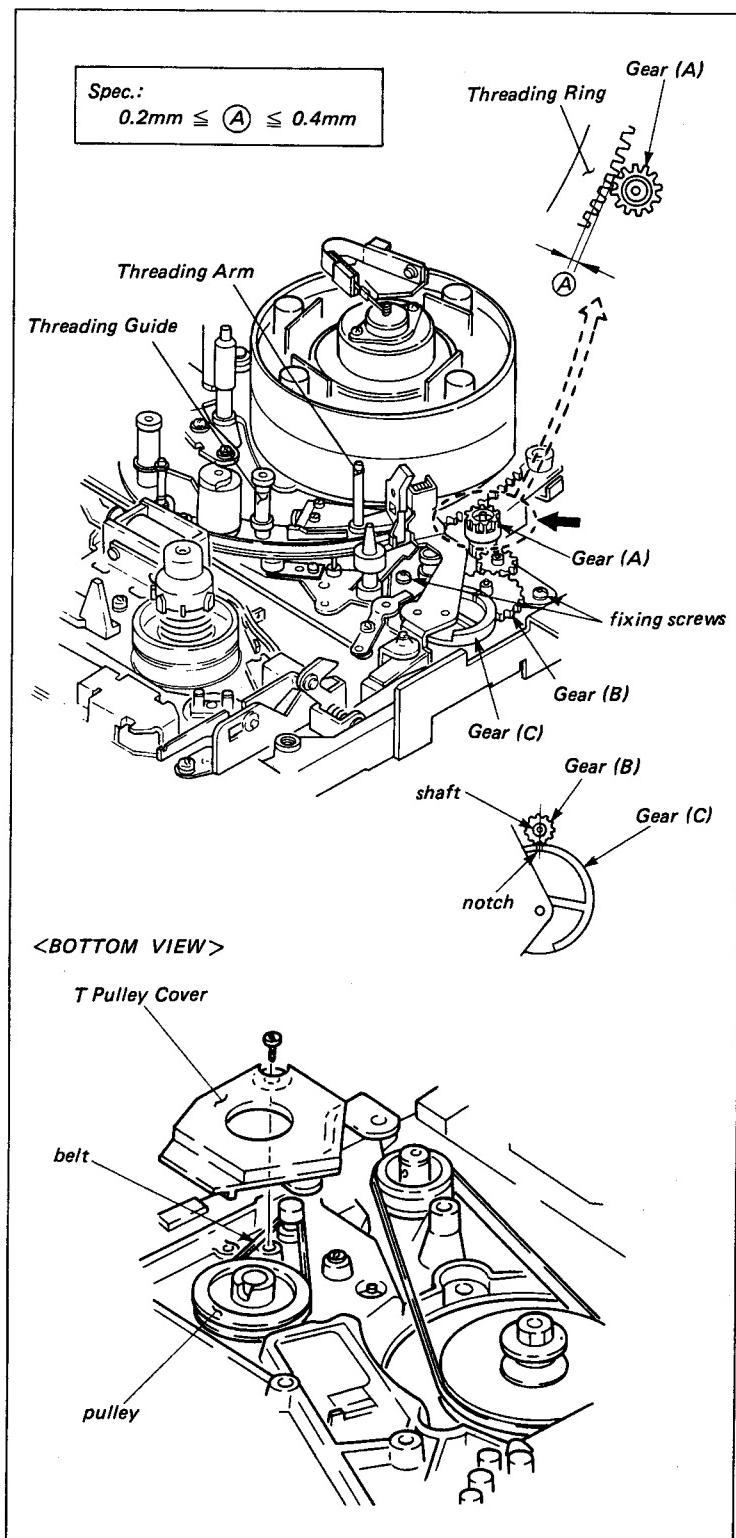
**Tool:** Wire clearance gauge

**Check procedure:**

- (1) Put the unit into the unthreading end mode.
- (2) Check that the clearance between the Gear (A) and Threading Ring meets the required specification (A).
- (3) Insert a cassette tape.
- (4) Check that the Threading Arm does not hit against the Threading Guide in the threading mode.

**Adjustment procedure:**

- (1) Put the unit into the unthreading end mode.
- (2) Remove the Battery Case.
- (3) Remove the T Pulley Cover in the back of the unit and the belt as shown in the figure.
- (4) Loosen the two fixing screws of the Gear Block about 1/4 turn from upper side of the unit. Disengage the Gear (A) from the Threading Ring.
- (5) Turn the pulley from bottom of the unit by hand so that the positional relationship between the notch of Gear (C) and the shaft of Gear (B) meets as shown in the figure.
- (6) Push the Threading Guide by finger to confirm the unthreading end mode.
- (7) Move the Gear (A) in the direction of the arrow so that it meets the required specification (A).
- (8) Turn the pulley in the back of the unit by hand. Check that the Threading Arm and the Threading Guide does not touch each other. When the Threading Arm touch against the Threading Guide, perform the following steps.
- (9) Perform adjustment procedures (1) to (6).



- (10) Disengage the Gear (A) and the Threading Ring. Turn the Gear (A) to one tooth in clockwise direction turning the pulley in the back of the unit.
- (11) Confirm as described in the adjustment procedures (7) and (8).
- (12) Clean the belt with a cloth moistened with cleaning fluid. Set the belt to the pulley. Turn the pulley by hand in counterclockwise direction to correct twist of the belt.
- (13) Install the T Pulley Cover and the battery case.
- (14) After adjustment, perform the Section 5-4-3, Joint lever (2) position adjustment.

#### 5-5-2. Ring Stopper B Height Adjustment

**Mode:** Unthreading end

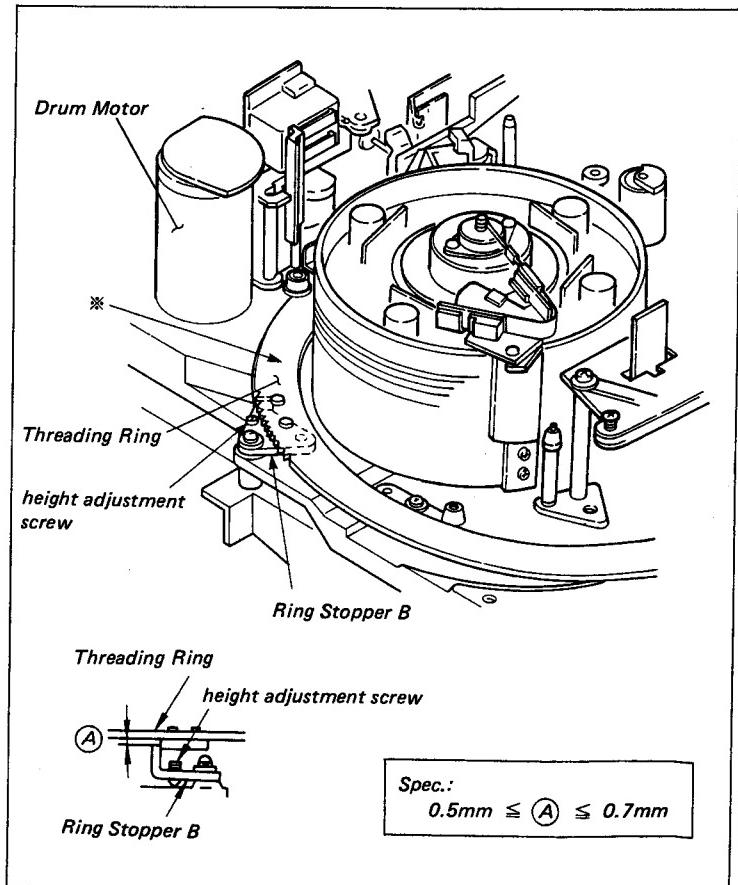
**Tool:** Inspection mirror

**Check procedure:**

- (1) Lift the \* marked portion of the Threading Ring lightly. Check that the clearance between the Threading Ring and the Ring Stopper B meets the required specification with a inspection mirror for adjustment.

**Adjustment procedure:**

- (1) Adjust the height with the adjustment screw of the Ring Stopper B so that meets the required specification.



### 5-5-3. Thread End Position Adjustment

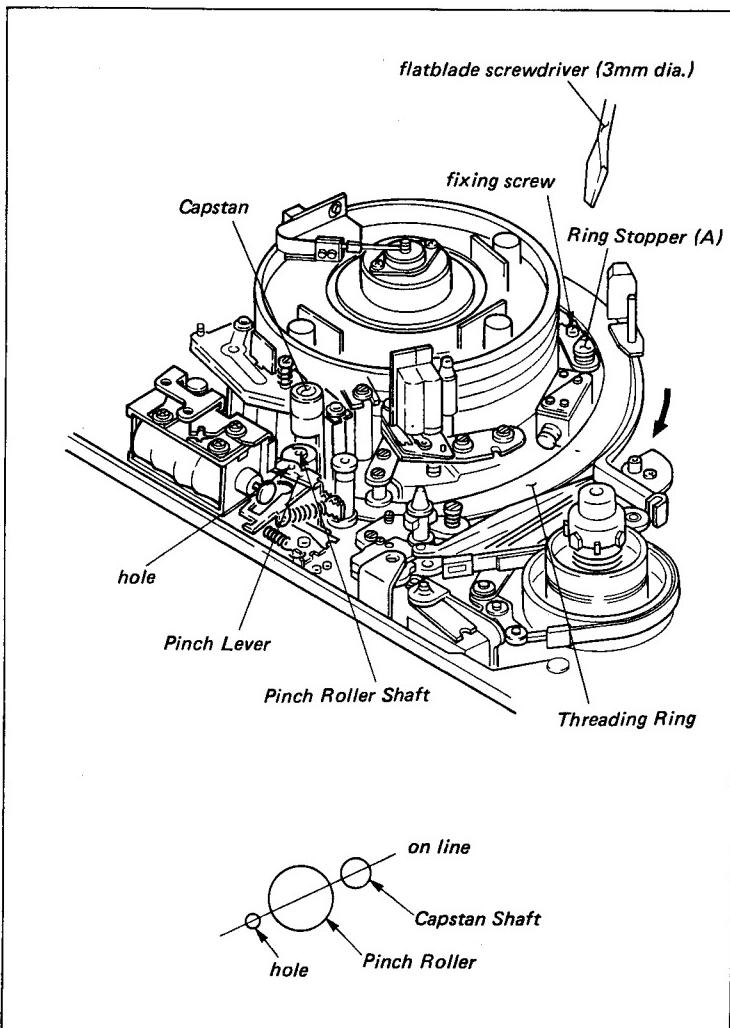
**Mode:** Threading end

**Check procedure:**

- (1) Put the unit into the threading end mode.
- (2) While pushing the Threading Ring in the direction of the arrow by hand, check that the center of Pinch Roller Shaft is in line with the Capstan Shaft and the hole in the Pinch Lever as shown in the figure.

**Adjustment procedure:**

- (1) Loosen the fixing screw of the Ring Stopper (A) about 1/4 to 1/2 turn.
- (2) Insert a flatblade screwdriver (3 mm dia.) between the notch of Ring Stopper (A) and the boss. While pressing the Threading Ring in the direction of the arrow by hand, adjust the position of the Ring Stopper (A) so that it meets the required specification.
- (3) Repeat the unthreading and threading mode two or three times and check that the positional relationship meets the required specification.
- (4) After adjustment, perform the Section 5-5-4, Stopper arm B position adjustment.



#### 5-5-4. Stopper Arm B Position Adjustment

- It is required that the Section 5-5-3, Thread end position adjustment is correct before initiating this adjustment.

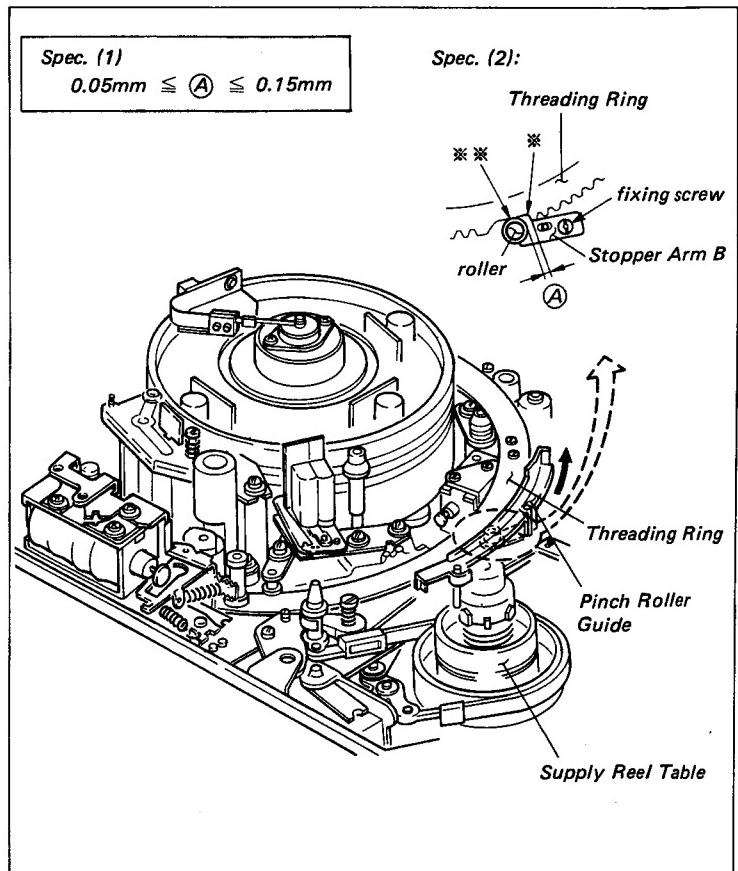
**Mode:** Threading end

**Check procedure:**

- (1) Insert a flatblade screwdriver (2 mm dia.) between the Threading Ring and the Pinch Roller Guide. While turning a flatblade screwdriver, remove the Pinch Roller Guide.
- (2) While pushing the Threading Ring in the direction of the arrow by hand, check that the clearance between \* marked portion of the Threading Ring and the Roller of the Stopper Arm B meets the required specification (1).
- (3) Check that the Roller of the Stopper Arm B contacts with the \*\* marked portion of the Threading Ring. (spec.2)

**Adjustment procedure:**

- (1) Loosen the fixing screw of the Stopper Arm B 1/4 turn.
- (2) While pushing the Threading Ring in the direction of the arrow by hand, adjust the position of the Stopper Arm B so that it meets the required specifications (1) and (2).
- (3) Repeat the unthreading and the threading mode two or three times and check that the clearance meets the required specifications (1) and (2).
- (4) Put the unit into the unthreading mode, and then turn the power off. Install the Pinch Roller Guide.



### 5-5-5. Thread End Switch Position Adjustment

- It is required that the Section 5-5-4, Stopper arm B position adjustment is correct before initiating this adjustment.

**Mode:** Threading end

**Tool:** Circuit tester

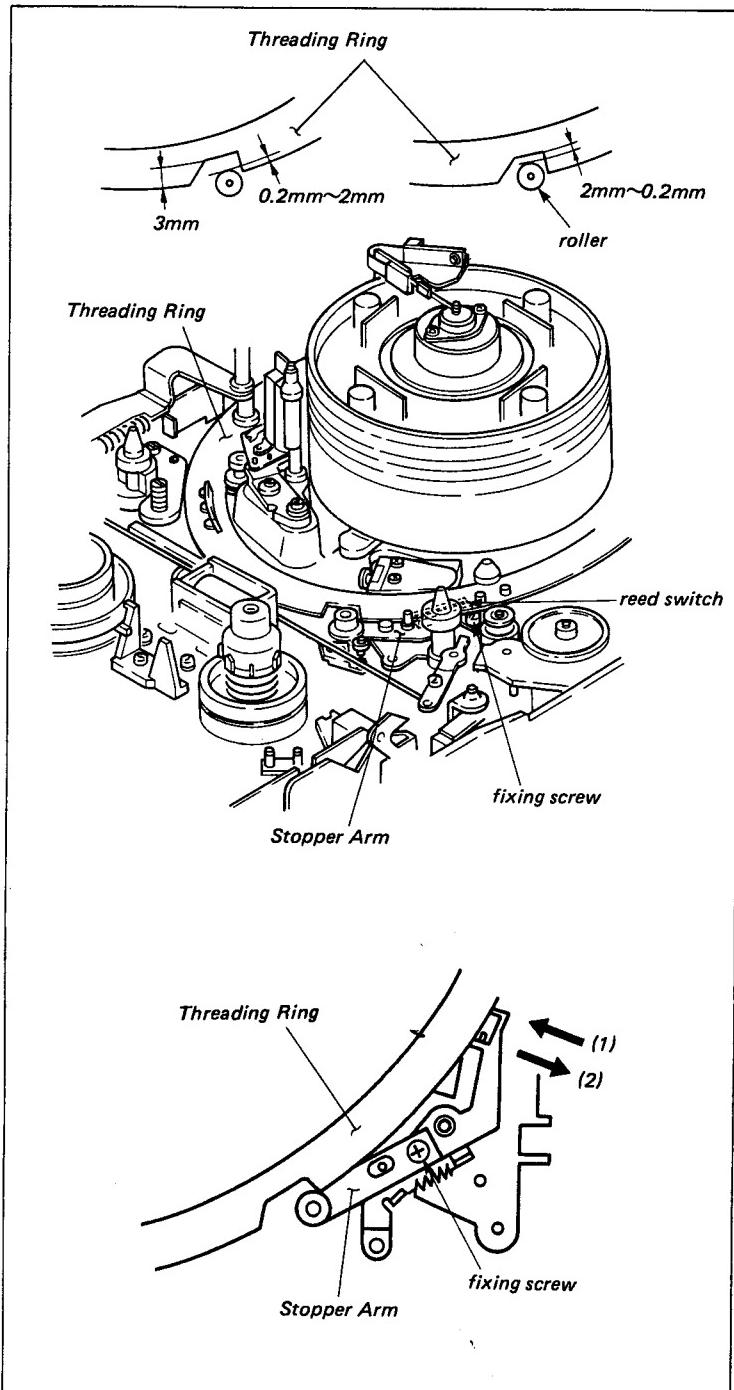
Thickness gauge

**Check procedure:**

- Insert a flatblade screwdriver (2 mm dia.) between the Threading Ring and the Pinch Roller Guide. While turning a flatblade screwdriver, remove the Pinch Roller Guide.
- Connect the circuit tester to pin 4 on CN12 on the SY-110 Board.
- Turn the power ON. Check that the circuit tester indicates +5 V.
- Move the Stopper Arm in the direction of the arrow (1). Check that the circuit tester indicate 0 V when the Roller is placed between 0.2 mm to 2 mm from the outer circumference of the Threading Ring. (Spec.1)
- After moving the Stopper Arm in the direction of the arrow (1), move the Stopper Arm in the direction of the arrow (2). Check that the circuit tester indicate +5 V when the Roller is placed between 2 mm to 0.2 mm from the indented portion of the Threading Ring. (Spec.2)

**Adjustment procedure:**

- Loosen the screw 1/2 turn as shown in the figure and adjust the position of the reed switch.



## 5-6. PINCH PRESS MECHANISM ADJUSTMENT

### 5-6-1. Pinch Solenoid Position Adjustment

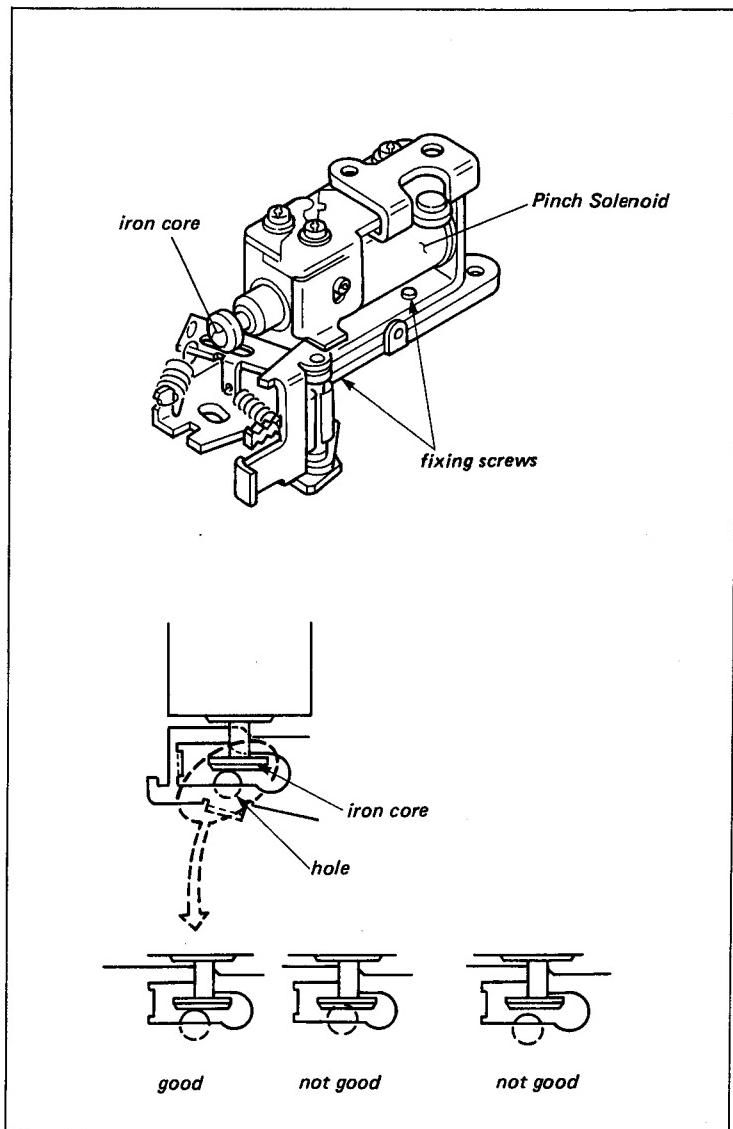
- This adjustment is usually not required. Proceed with the following step only when the Pinch Solenoid is replaced or removed. Remove the pinch press mechanism from the unit in this adjustment.

#### Check procedure:

- (1) Push the iron core of the Pinch Solenoid into the fully energized position with finger.
- (2) Check that the positional relationship between the top of the iron core and the hole of the Solenoid Bracket meets the required specification as shown in the figure.

#### Adjustment procedure:

- (1) Loosen the fixing screws of the Pinch Solenoid, and adjust the position of the solenoid so that it meets the required specification.
- (2) After adjustment, perform the following adjustments;  
Section 5-6. All of the pinch press mechanism adjustments  
Section 7-1-2. Tape run adjustment (around the pinch roller).



### 5-6-2. Pinch Pressure Adjustment

- Remove the pinch press mechanism from the unit in this adjustment.

**Tool:** String for measurement

(Make a loop about 15 cm long as shown in the figure.)

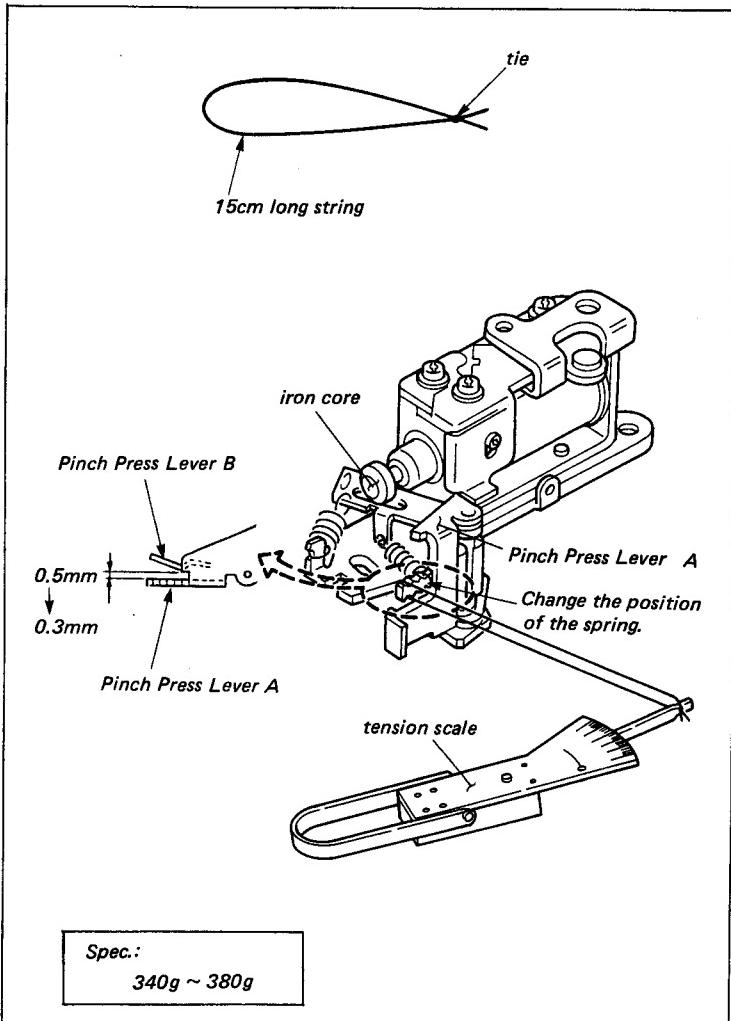
Tension scale (500 g full scale)

**Check procedure:**

- Hook the string on the Pinch Press Lever as shown in the figure and hook a tension scale on an end of the string.
- While pushing the iron core of the Pinch Solenoid into the energized position with finger, move the tension scale in the right angle direction of the Pinch Press Lever.
- Move the tension scale so that the clearance between the Pinch Press Lever A and B is about 0.5 mm (visual check) and return the tension scale slowly. When the clearance is about 0.3 mm (visual check) check that the scale reading meets the required specification.

**Adjustment procedure:**

- Change the position of the spring as shown in the figure so that it meets the required specification.
- After adjustment, perform the following adjustments;  
Section 5-6-6, Pinch press mechanism block position adjustment  
Section 7-1-2, Tape run adjustment (around the pinch roller).



### 5-6-3. Pinch Press Lever B Position Adjustment

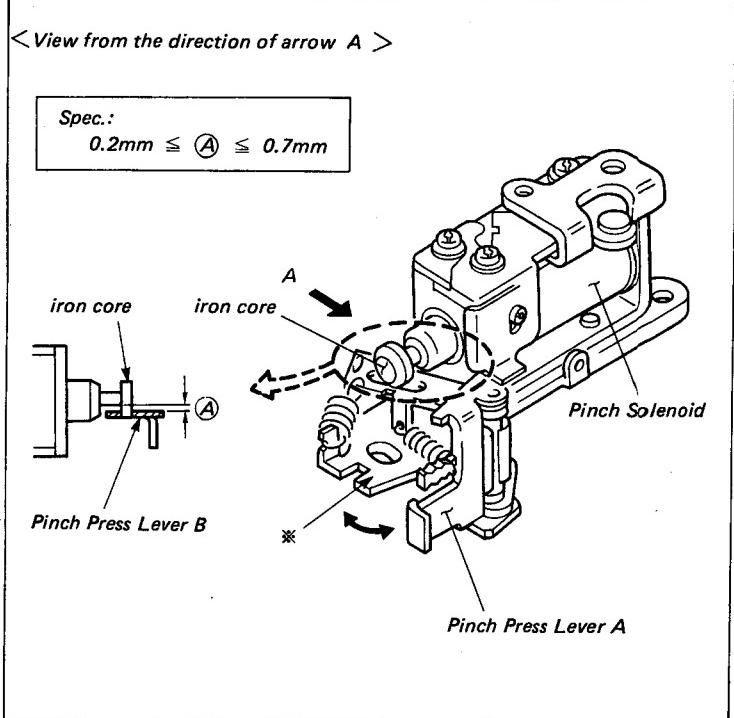
- This adjustment is required only when the Pinch Solenoid and the Pinch Press Lever B are replaced or removed. Remove the pinch press mechanism from the unit in this adjustment.

#### Check procedure :

- (1) Check that the clearance between the iron core of the Pinch Solenoid and the Pinch Press Lever B meets the required specification.
- (2) When pushing A portion of the Pinch Press Lever in the direction of the arrow as far as it will go, check that this operation is smooth.

#### Adjustment procedure:

- (1) Bend the \* marked portion of the Pinch Press Lever B with pliers so that meets the required specification.
- (2) After adjustment, perform the following adjustments;  
Section 5-6-6, Pinch press mechanism block position adjustment  
Section 7-1-2, Tape run adjustment (around the pinch roller).



#### 5-6-4. Arm Retainer Position Adjustment

- Remove the pinch press mechanism from the unit in this adjustment.

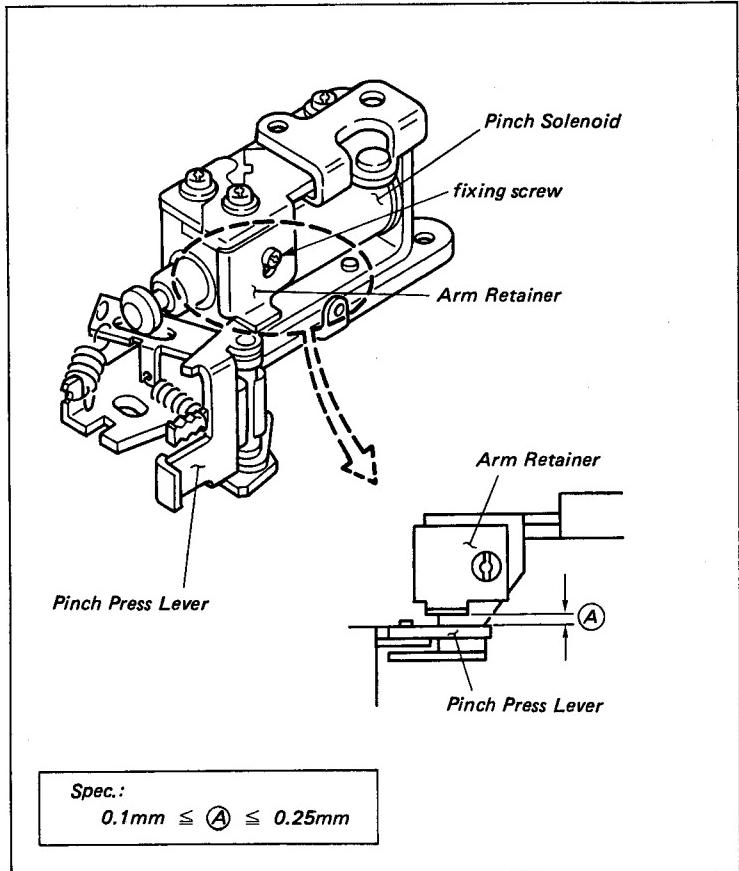
**Tool:** Thickness gauge

**Check procedure:**

- Check that the clearance between the Pinch Press Lever and the Arm Retainer meets the required specification.

**Adjustment procedure:**

- Adjust the position of the Arm Retainer to meet the required specification.

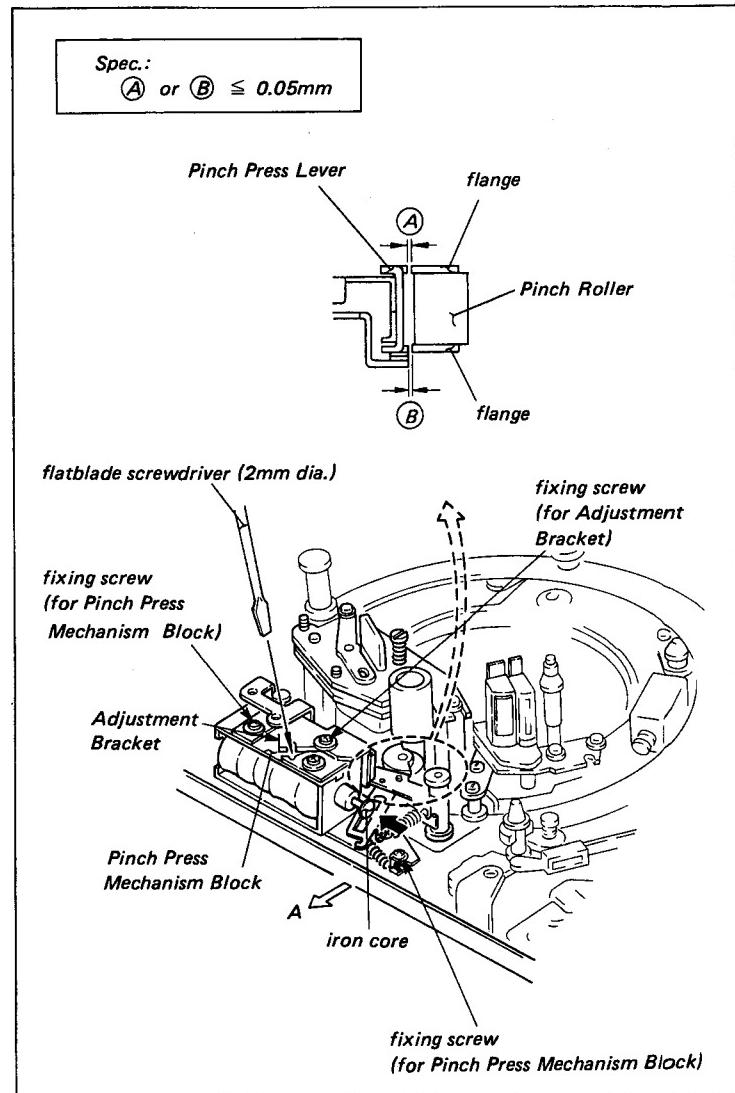


### 5-6-5. Pinch Press Lever Slantness Adjustment

**Mode:** Threading end

**Adjustment procedure:**

- (1) Remove the Tape End Sensor Block.
- (2) While pushing the Tension Regulator Arm in the direction of the Reel Table, loosen the two fixing screws of the Pinch Press Mechanism Block.
- (3) Move the Pinch Press Mechanism Block in the direction of the arrow A, then install the Pinch Press Mechanism Block with two fixing screws.
- (4) Loosen the fixing screw of the Adjusting Bracket about 1/2 turn.
- (5) Push the iron core of Pinch Solenoid in the direction of the arrow into the fully energized position.
- (6) Insert a flatblade screwdriver (2 mm dia.) into the notch of the Adjustment Bracket. Adjust the position of the Adjustment Bracket so that the clearance between the upper and lower flanges of the Pinch Roller and the Pinch Press Lever meets the required specification.
- (7) After adjustment, perform the following adjustments;
  - Section 5-6-6, Pinch press mechanism block position adjustment.
  - Section 5-3-3, Tape end sensor position adjustment



### 5-6-6. Pinch Press Mechanism Block Position Adjustment

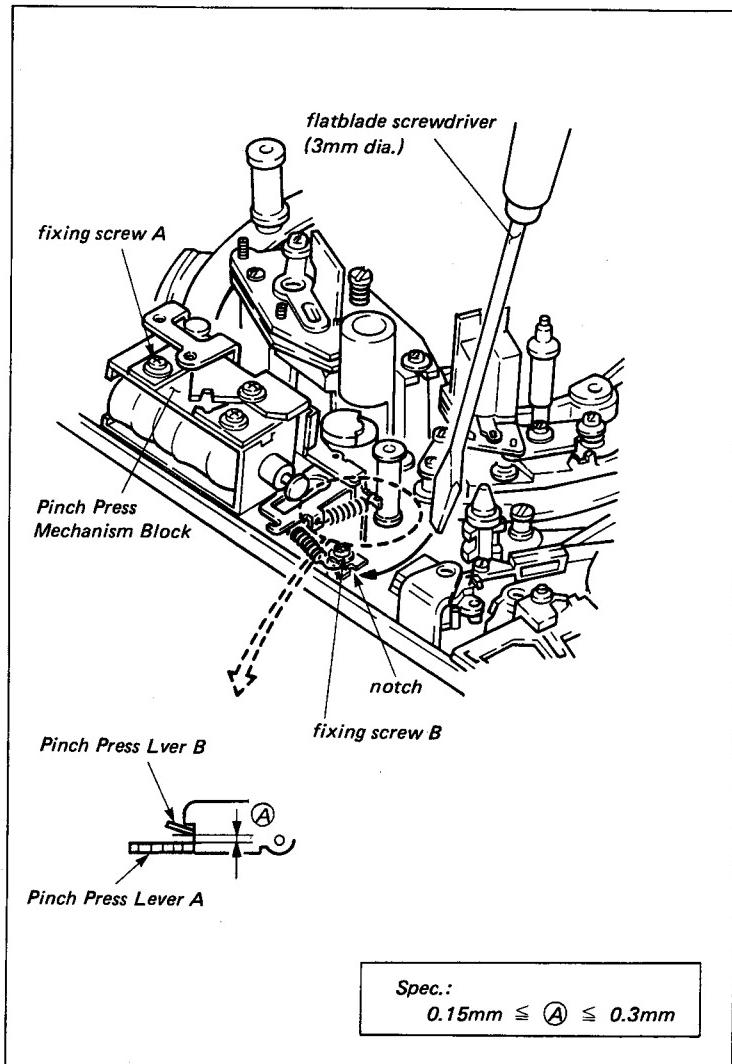
**Mode:** PLAY mode without a cassette tape

**Check procedure:**

- (1) Put the unit into the PLAY mode without a cassette tape.
- (2) Check that the clearance between the Pinch Press Lever A and B meets the required specification.
- (3) Repeat the unthreading and the threading completion modes (PLAY mode) two or three times, and check that the clearance meets the required specification.

**Adjustment procedure:**

- (1) While pushing the Tension Regulator Arm in the direction of the S-reel Table, loosen the two fixing screws of the Pinch Press Mechanism Block about 1/4 turn.
- (2) Adjust the position of the Pinch Press Mechanism Block with a flatblade screwdriver (3 mm dia.). Tighten the fixing screw A (screw in the rear panel side.).
- (3) Pull out the flatblade screwdriver from the notch. Tighten the fixing screw B (screw in the front panel side.).
- (4) Perform the check procedures (1) to (3).
- (5) Install the Tape End Sensor Block.
- (6) Perform the section 5-3-3, Tape end sensor position adjustment.



### 5-6-7. Pinch Press Lever Height Adjustment

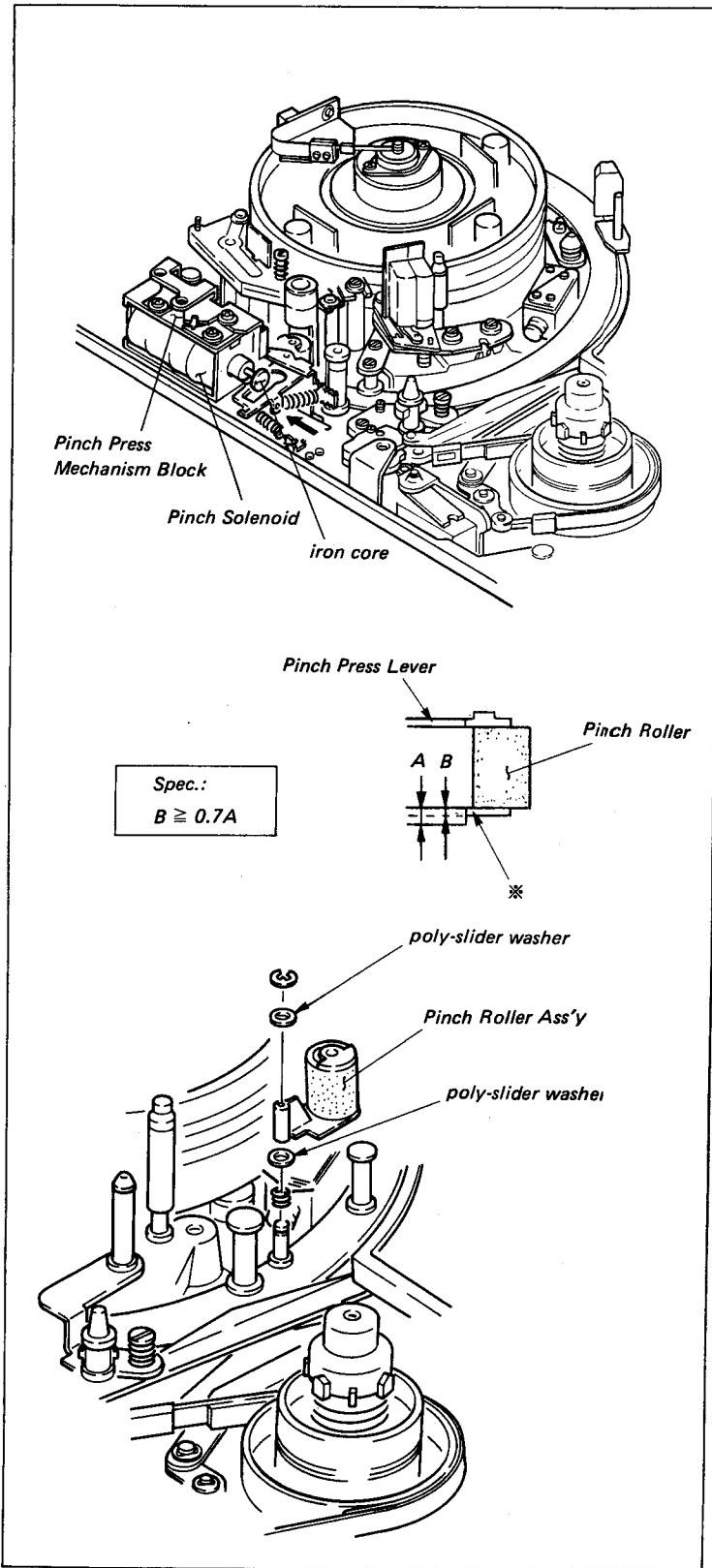
**Mode:** Threading end

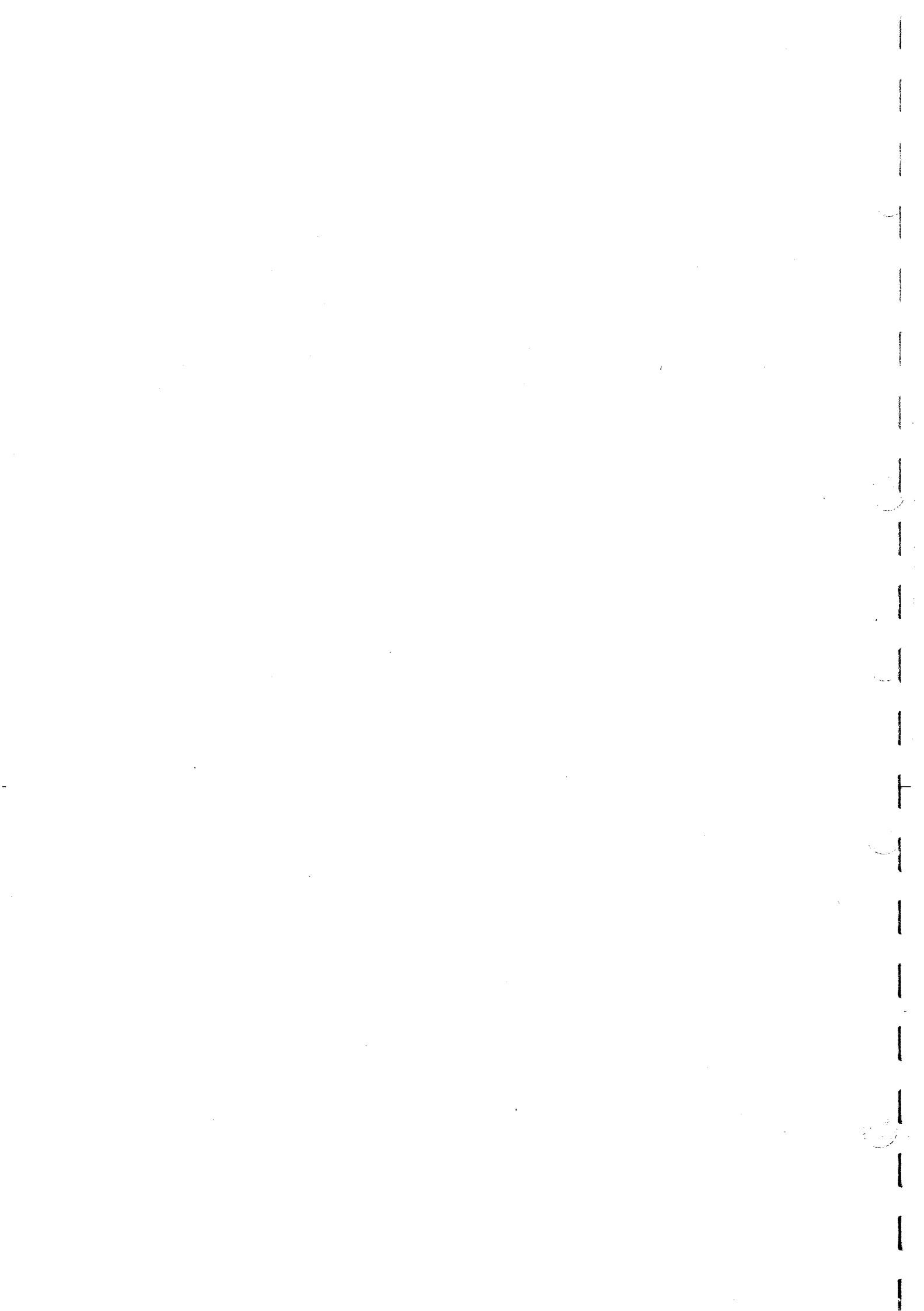
**Check procedure:**

- (1) Remove the Tape End Sensor Block.
- (2) Push the iron core of the Pinch Solenoid slowly in the direction of the arrow. Check that the Top and Bottom Plates of the Pinch Press Lever press the \* marked portion of the Pinch Roller. Check that the positional relationship between the lever and the marked portion of the Pinch Roller meets the required specification.

**Adjustment procedure:**

- (1) Put the unit into the unthreading end mode.
- (2) Replace the poly-slider washer under the Pinch Roller Ass'y so that it meets the required specification.  
Poly-slider washer for adjustment;  
3-701-436-01 1.6 mm dia. 0.13 mm thick  
3-701-436-11 1.6 mm dia. 0.25 mm thick  
3-701-436-21 1.6 mm dia. 0.5 mm thick
- (3) After replacement, check the vertical play of the Pinch Roller as described in Section 5 so that it meets the required specification.
- (4) Install the Tape End Sensor Block. Perform the section 5-3-3, Tape end sensor position adjustment.





## SECTION 6

### TORQUE AND BACK TENSION ALIGNMENT

#### ALIGNMENT INFORMATION

##### MODE

###### Threading end mode

Keep pressing the cassette-in switch till the threading ring rotation is stopped.

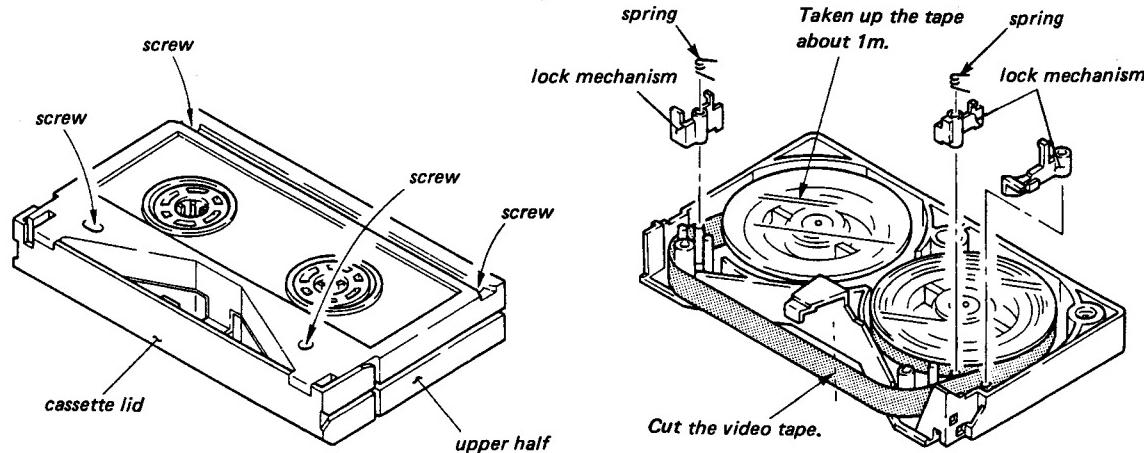
This state means the threading end mode.

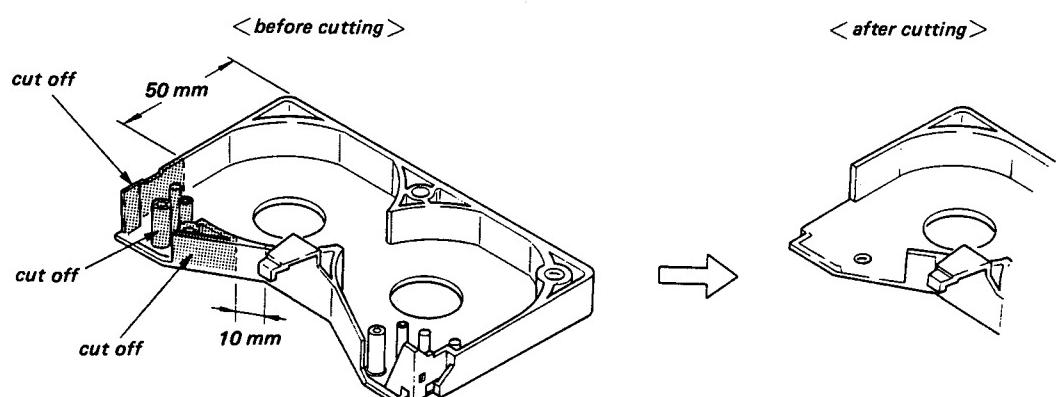
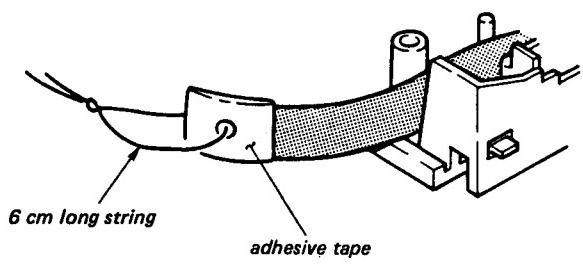
#### HOW TO MAKE THE LOCALLY-PRODUCED-TAPE

This tape is used for the FWD back tension adjustment. Prepare this tape as follows:

- (1) Wind the BCT-20K cassette tape to the tape beginning portion.
- (2) Remove the four fixing screws from the back of the cassette tape. While releasing the lock of the cassette lid, remove the upper half of the cassette.
- (3) Remove the lock mechanism parts and the springs on the left and right.
- (4) Take up the video tape on the take-up reel about 1 meter. Cut the video tape at the position as shown in the figure. Remove the take-up reel from the cassette.
- (5) Attach an adhesive tape on an end of the tape at the supply side and make a hole on the adhesive tape.
- (6) Make a loop of 6 cm long string through the hole.
- (7) Remove once the supply reel from the lower half.
- (8) Cut off the lower half at the position as shown in the figure with nippers.
- (9) Put the supply reel on the lower half.

*locally-produced-tape*





## 6-1. FWD BACK TENSION ADJUSTMENT

Tool: Tension scale

Locally-produced-tape

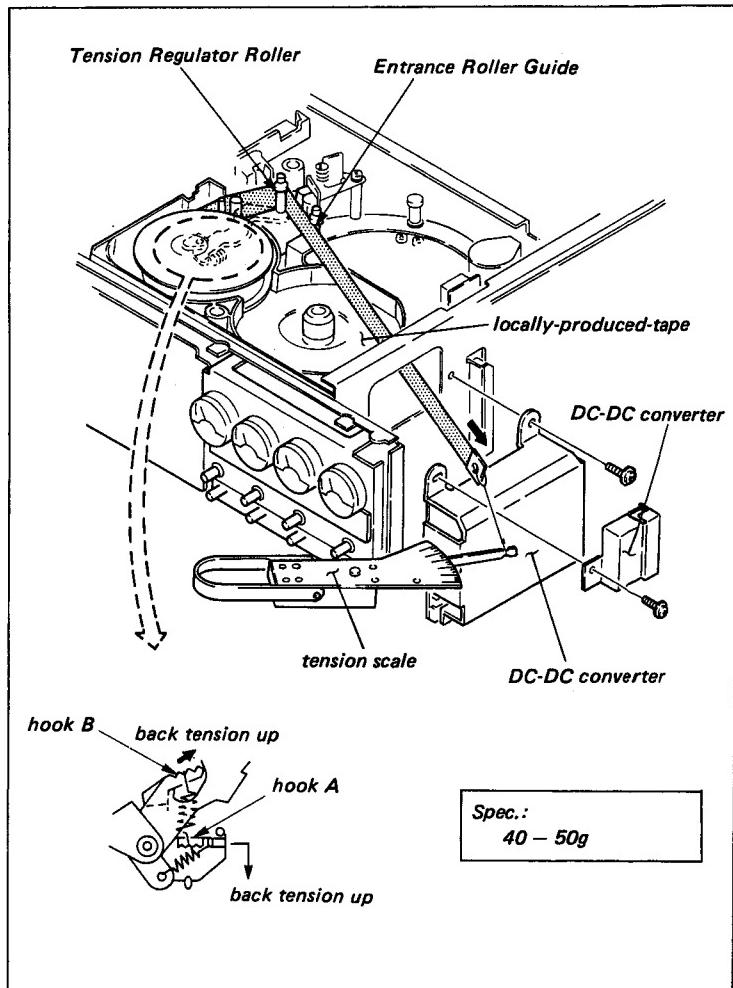
(Refer to alignment information.)

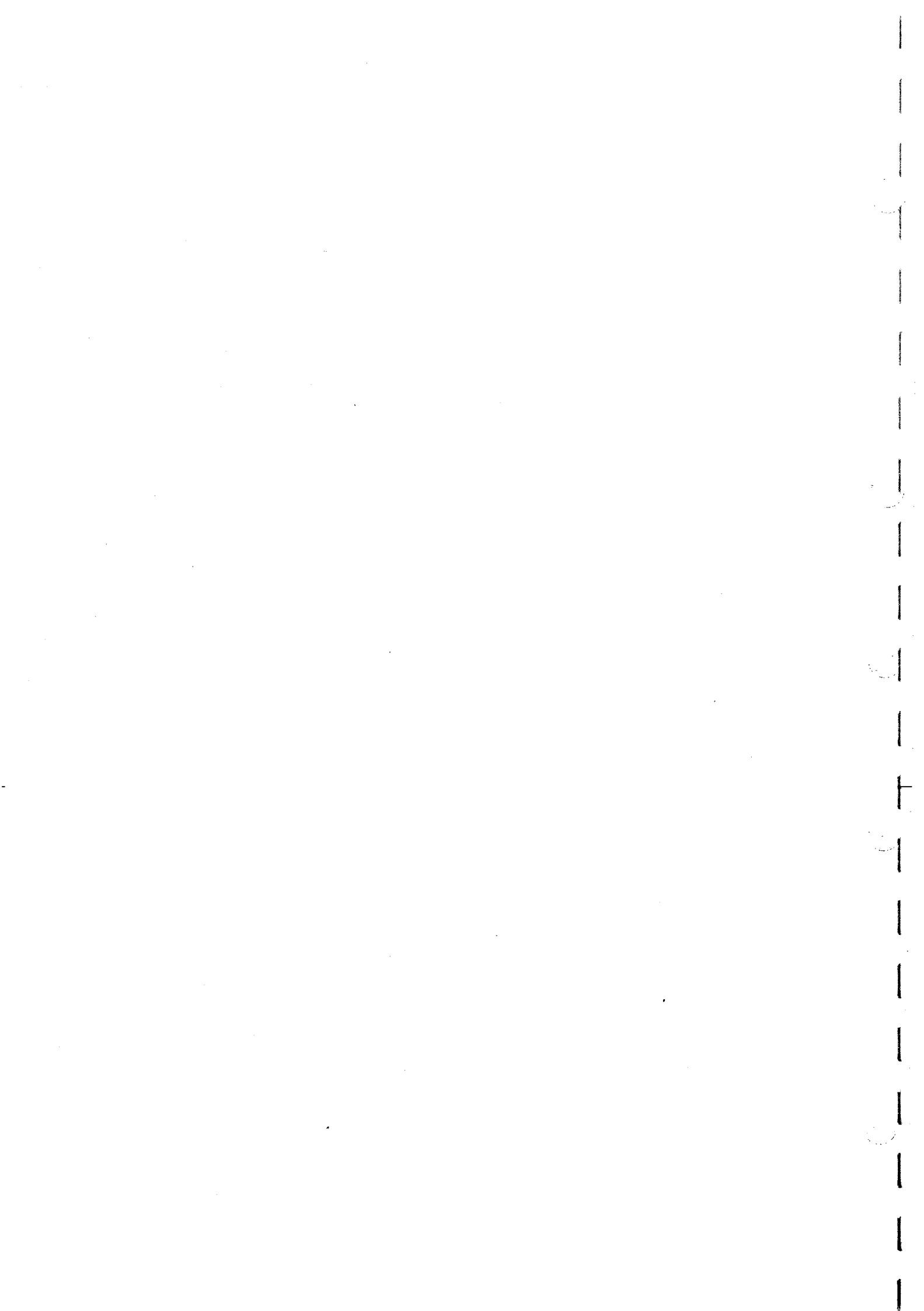
Check procedure:

- (1) Remove the four fixing screws from the Connector Panel, and open the Connector Panel.
- (2) Remove the two fixing screws from the DC-DC converter.
- (3) Remove the DC-DC converter once as shown in the figure.
- (4) Install the locally-produced-tape on the unit in the threading completion mode.
- (5) Thread the cassette tape and hook a tension scale on to an end of the tape.
- (6) While holding the cassette lower half so that the cassette half does not rise, put the unit into the PLAY mode.
- (7) Pull out the tape at a constant speed of approx. 12 cm/sec. in the direction of the arrow. Check that the scale reading meets the required specification.

Adjustment procedure:

- (1) Change the spring position of the spring hook at A side so that it meets the required specification.
- (2) If does not meet the specification in Step (1), change the spring position of the spring hook at B side.





## **SECTION 7**

### **TAPE RUN ALIGNMENT**

#### **ALIGNMENT INFORMATION**

##### **ALIGNMENT TAPE**

- Alignment tape for tracking adjustment**

There are two types alignment tape for tracking adjustment.

- (1) Tracking tape, CR2-1BPS (8-960-096-51)
- (2) Tracking tape, CR2-1PS (8-960-098-02)

- Alignment tape for general adjustment**

There are three types alignment tape for general adjustment.

- (1) CR5-1B PS (8-960-096-91)
- (2) CR8-1B PS (8-960-096-86)
- (3) CR5-2A PS (96-0098-44)

## MODE

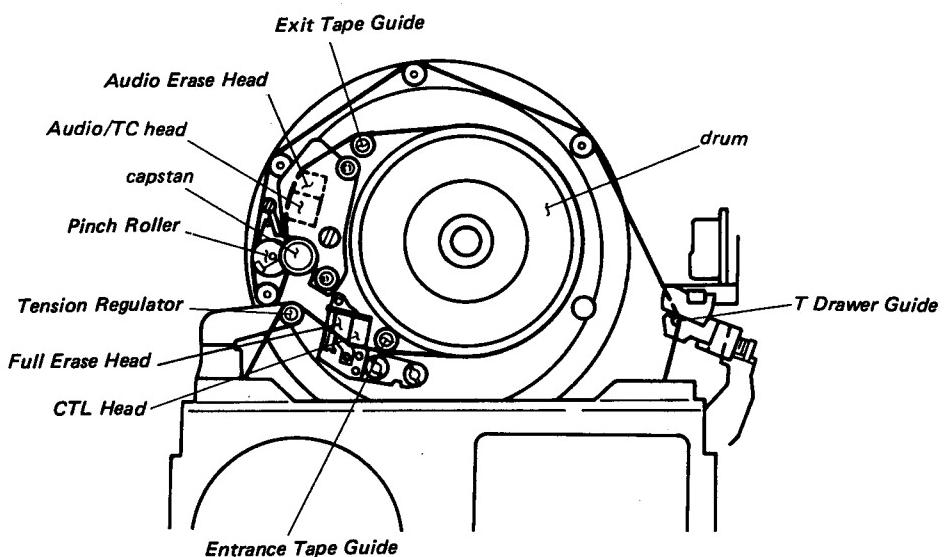
### • Unthreading end mode

It means EJECT completion mode.

The threading guide, tension regulator arm and threading ring are put back at the cassette tape side completely.

## THE LOCATION OF HEADS AND TAPE GUIDES

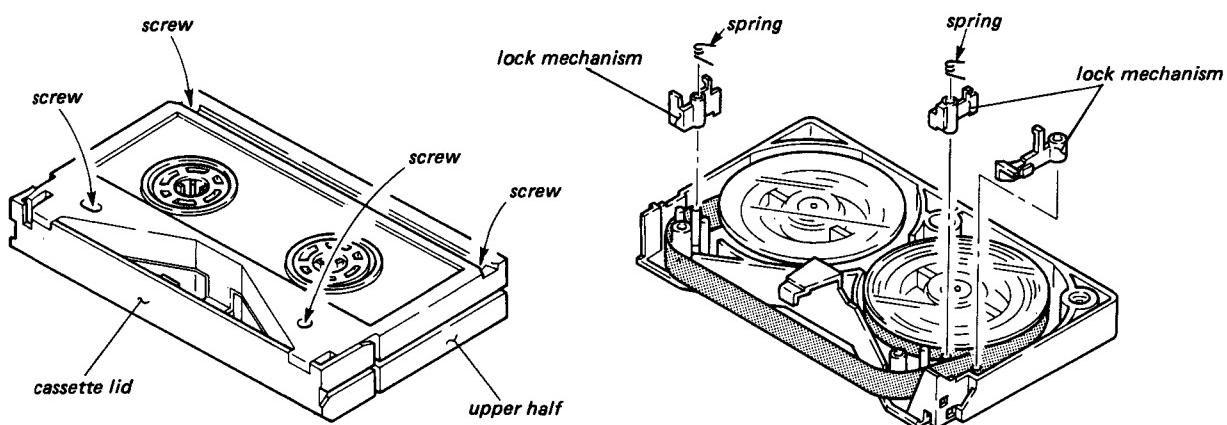
The heads and tape guides are located as follows;



## HOW TO MAKE THE CASSETTE TAPE WITHOUT A LID

Since the VTR is designed compact size, the check and adjustment cannot be performed if cassette tape lid is installed.

- (1) Remove the four screws on the back of the cassette as shown in the figure, and remove the upper half of the cassette.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with four screws from the back side.



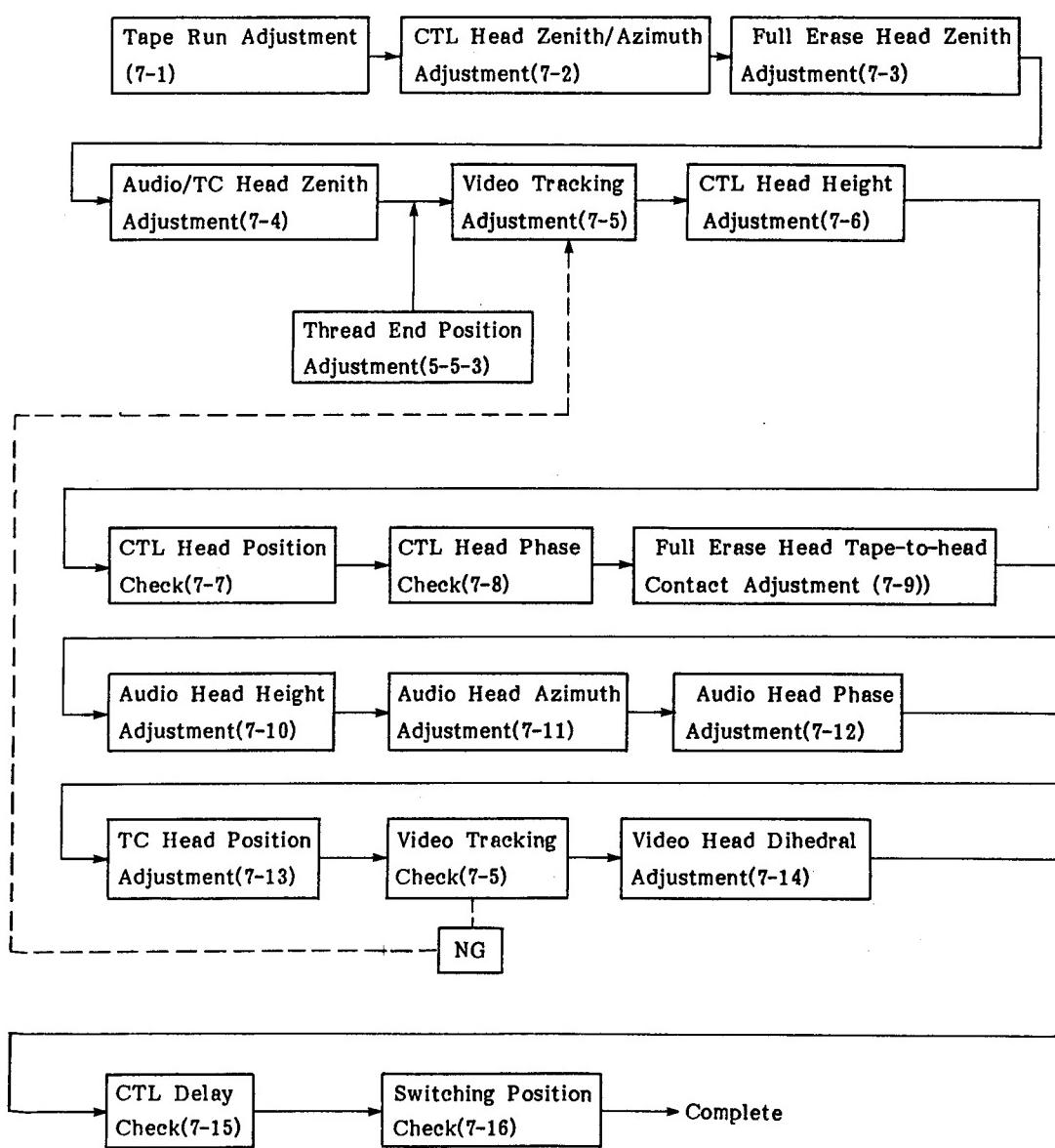
## HOW TO MAKE THE ALIGNMENT TAPE WITHOUT A LID

Since the VTR is designed compact size, the check and adjustment cannot be performed if the alignment tape lid is installed.

Remove the lid of the alignment tape CR2-1PS and CR2-1BPS for the tracking adjustment referring "How to make the cassette tape without a lid".

### ADJUSTMENT STEPS OF TRACKING ADJUSTMENT

Perform the tracking adjustment of Video, Audio, CTL and Time Code Heads as follows;



## 7-1. TAPE RUN ADJUSTMENT

### 7-1-1. Tape Run Adjustment (T Drawer Guide Slantness Adjustment)

Mode: PLAY

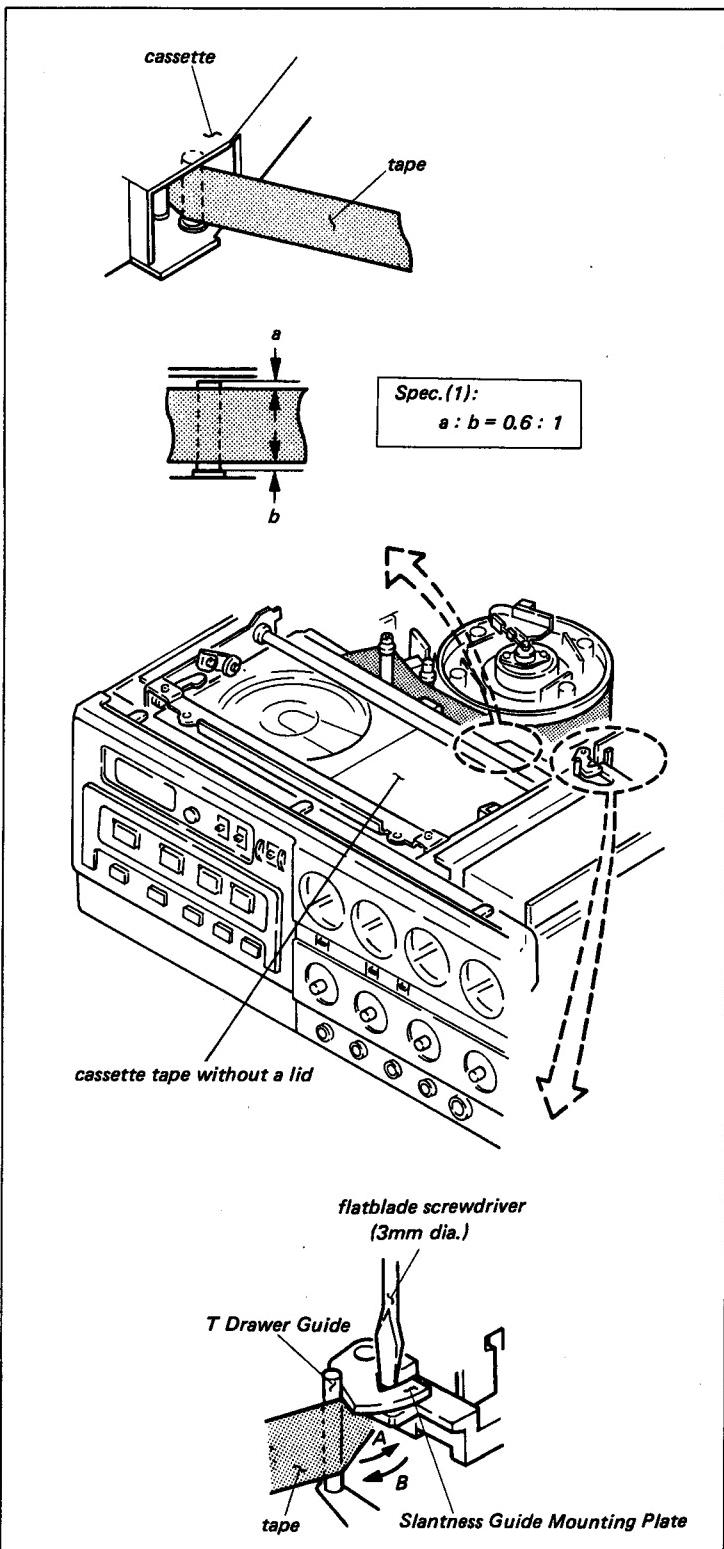
Tool: Cassette tape without a lid

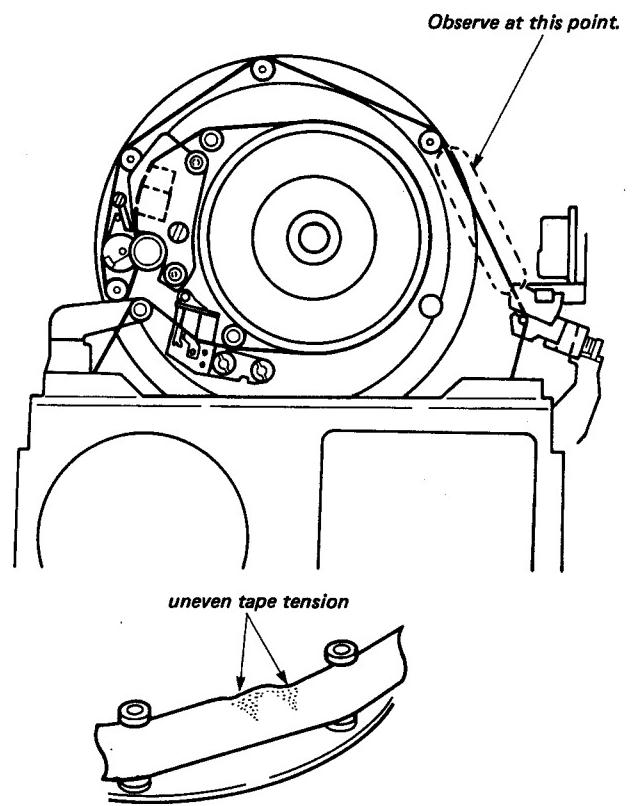
Check procedure:

- (1) Insert a cassette tape and put the unit into the PLAY mode. (Never use the alignment tape.)
- (2) Check that the positional relationship between the tape and the tape guide at the take-up side of the cassette tape as shown in the figure. (Spec.1)
- (3) Turn the PAUSE mode ON/OFF. Observe the surface of the running tape very carefully. Check that the tape tension is exactly equal at the top and bottom of the tape. (Spec.2)
- (4) Perform Step (3) four or five times.

Adjustment procedure:

- (1) Adjust the position of the Slantness Guide Mounting Plate so that it meets the required specifications (1) and (2).
  - When the tape runs at the upper portion of the Tape Guide, move the Slantness Guide Mounting Plate in the direction of A by hand.
  - When the tape runs at the lower portion of the Tape Guide, move the Slantness Guide Mounting Plate in the direction of B with a flatblade screwdriver (3 mm dia.).
  - When the tape tension meets the Spec.(1), a bit of uneven tape tension at the top or the bottom of the tape is acceptable.





### 7-1-2. Tape Run Adjustment Around Pinch Roller

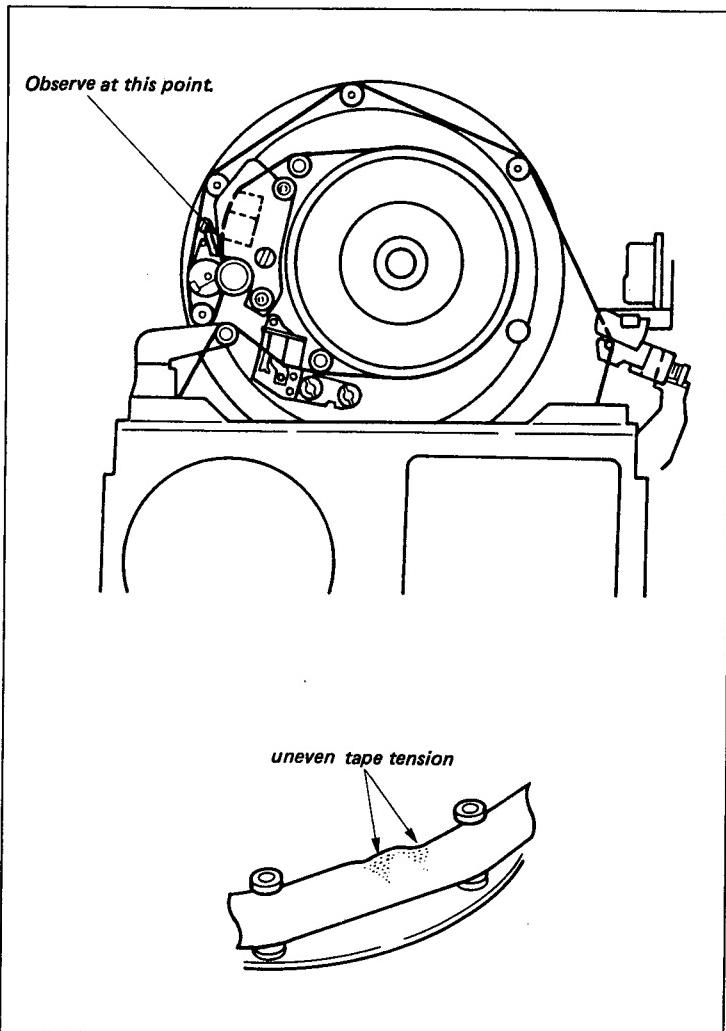
**Mode:** PLAY

**Check procedure:**

- (1) Insert a cassette tape and put the unit into the PLAY mode. (Never use the alignment tape.)
- (2) Observe the surface of the running tape between the Audio Head and the capstan very carefully. Check that the tape tension is exactly equal at the top and the bottom of the tape.
- (3) Turn the PAUSE mode ON/OFF. Check that the tape tension is exactly equal at the top and bottom of the tape.

**Adjustment procedure:**

- (1) Perform the Section 7-4, Audio/TC head zenith adjustment.
- (2) If the specification cannot be met by Step (1), replace the Pinch Roller Block. Perform the Section 5-5-3, Thread end position adjustment.
- (3) Perform the check procedures.



## 7-2. CTL HEAD ZENITH/AZIMUTH ADJUSTMENT

**Mode:** Threading end

**Tool:** Cassette reference plate

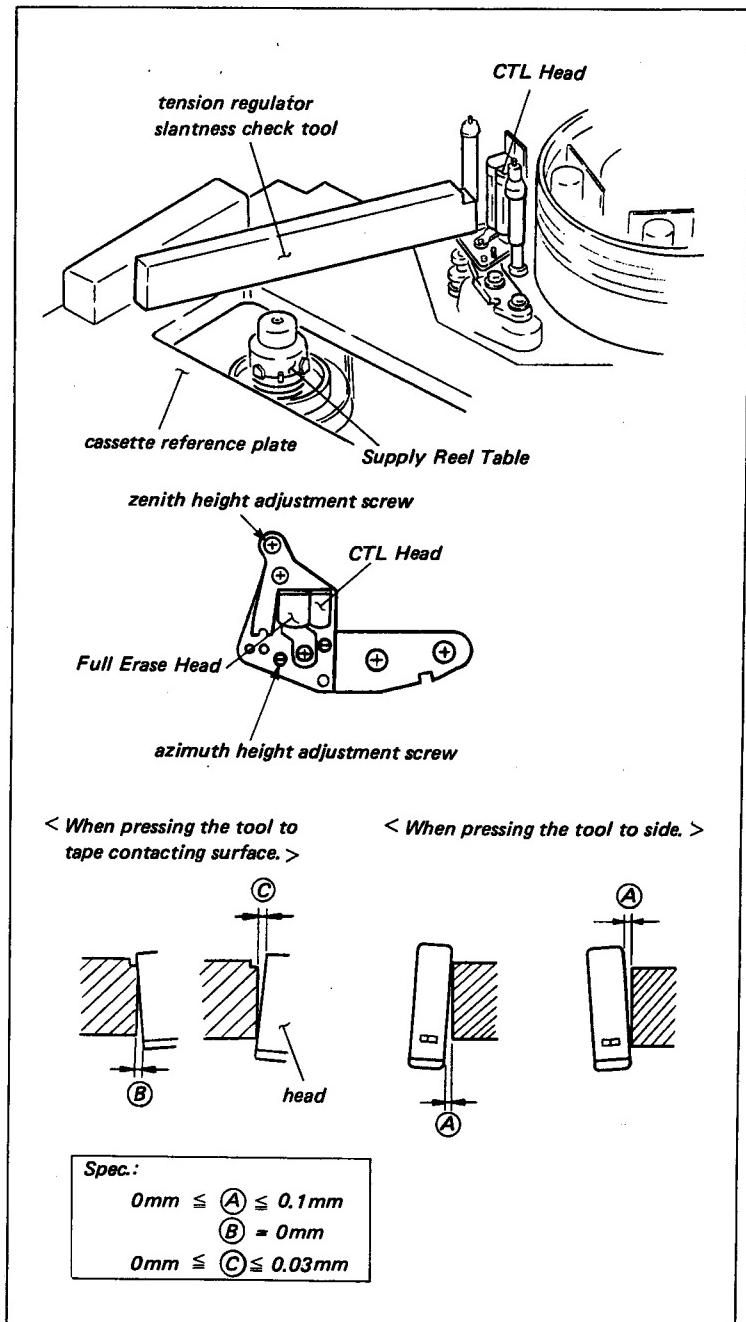
Tension regulator slantness check tool

**Check procedure:**

- (1) Install the cassette reference plate on the cassette position.
- (2) Place the tension regulator slantness check tool at the front of the CTL Head lightly. Check that the zenith of the CTL Head meets the required specification.
- (3) Place the tension regulator slantness check tool at the side of the CTL Head as shown in the figure. Check that the azimuth of the CTL Head meets the required specification.

**Adjustment procedure:**

- (1) Adjust the clearances B and C so that it meets the required specification with the zenith height adjustment screw.
- (2) Adjust the clearance A so that it meets the required specification with the azimuth height adjustment screw.



### 7-3. FULL ERASE HEAD ZENITH ADJUSTMENT

**Mode:** Threading end

**Tool:** Cassette reference plate

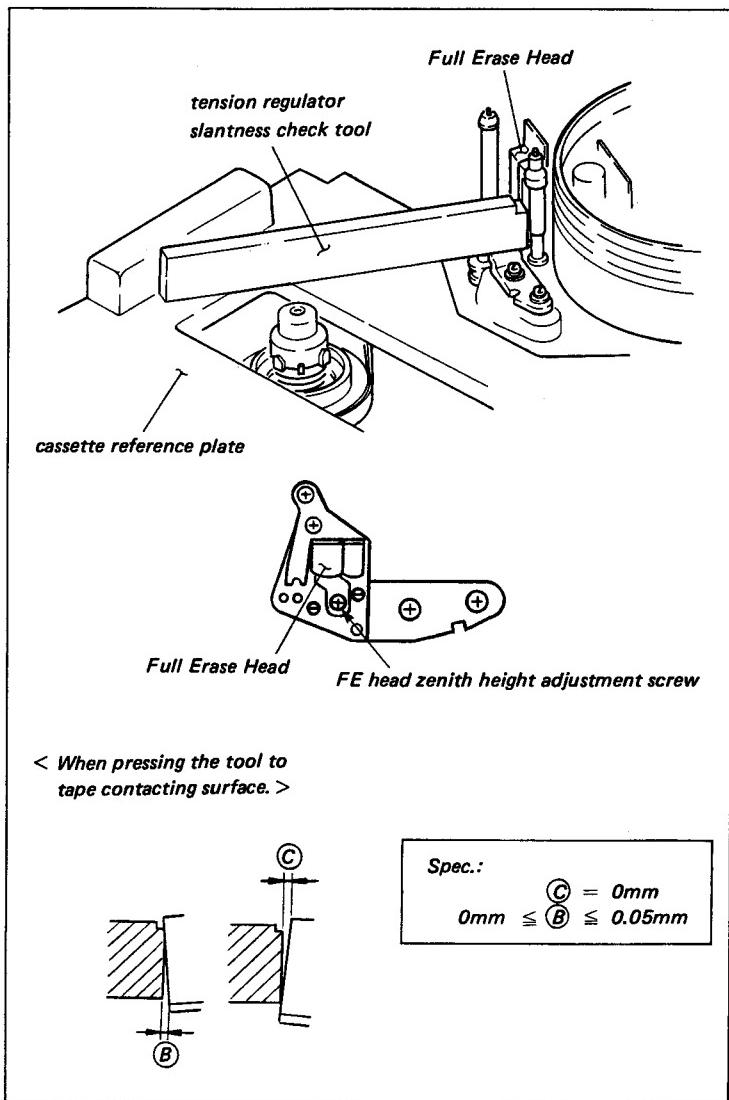
Tension regulator slantness check tool

**Check procedure:**

- (1) Install the cassette reference plate on the cassette position.
- (2) Place the tension regulator slantness check tool at the front side of the Full Erase Head as shown in the figure. Check that the zenith of the Full Erase Head meets the required specification.

**Adjustment procedure:**

- (1) Adjust the zenith so that it meets the required specification with the FE head zenith height adjustment screw.



#### 7-4. AUDIO/TC HEAD ZENITH ADJUSTMENT

- Audio/TC Head Block is comprised of the Audio Head, Time Code Head, Audio Confidence Head and Audio Erase Head.

**Mode:** Unthreading end

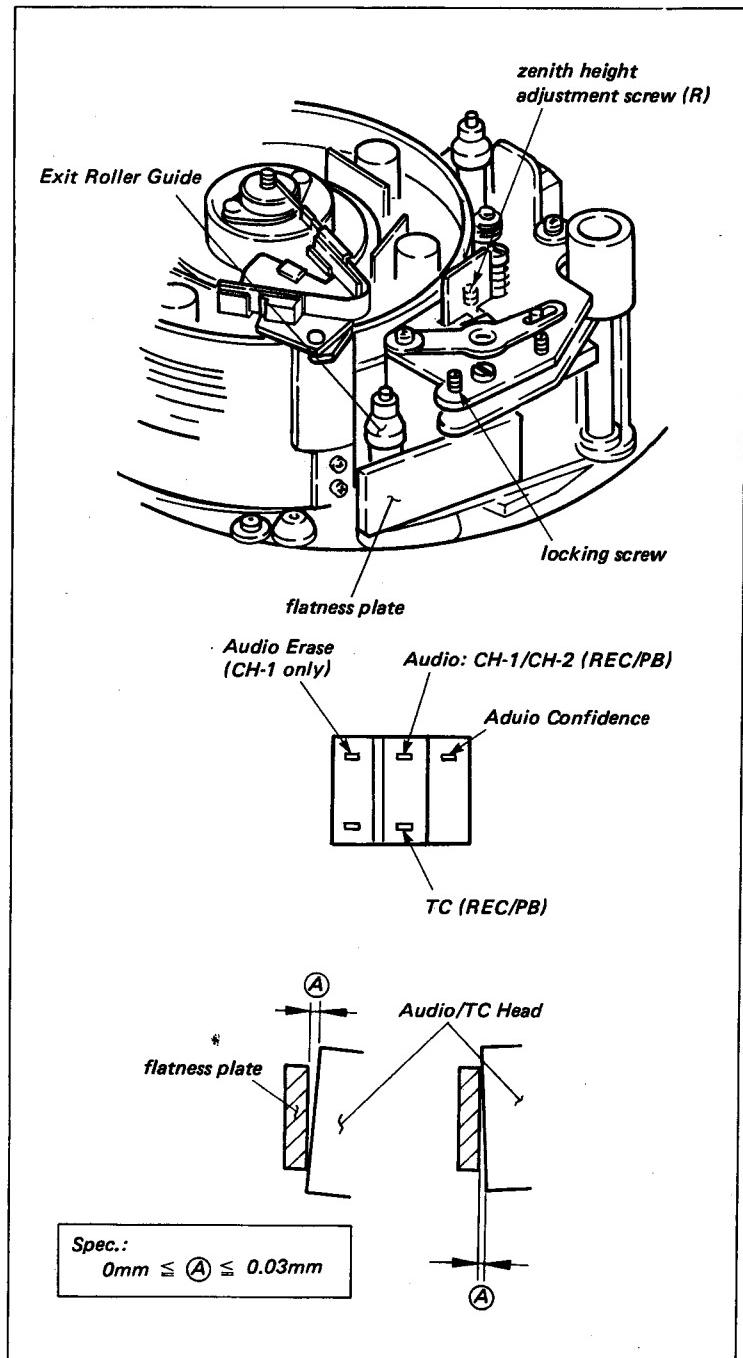
**Tool:** Flatness plate

**Check procedure:**

- (1) Check that the clearance between the head and the flatness plate meets the required specification, when installing the flatness plate on the Audio/TC Head and the Exit Roller Guide.

**Adjustment procedure:**

- . When there is a clearance at the bottom portion.
  - (1) Loosen the locking screw about 1/4 to 1 turn.
  - (2) Turn the zenith height adjustment screw (R) in the clockwise direction so that the zenith meets the required specification.
  - (3) Tighten the locking screw and check the zenith again.
- . When there is a clearance at the top portion.
  - (4) Loosen the locking screw about 1/4 to 1 turn.
  - (5) Turn the zenith height adjustment screw (R) in the counterclockwise direction so that the zenith meets the required specification.
  - (6) Tighten the locking screw and check again.



## 7-5. VIDEO TRACKING ADJUSTMENT

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1BPS

Oscilloscope

Inspection mirror

PB amplifier tool

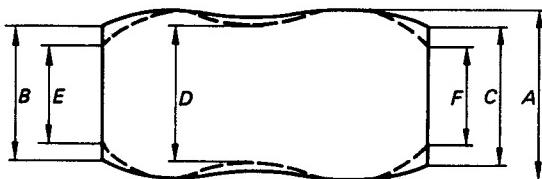
### Preparation:

- (1) Disconnect CN403 of the VRA-1 Board.
- (2) Connect the connector of the harness to the INPUT connector of the PB amplifier tool.
- (3) Disconnect CN10 of the MB-157 Board.
- (4) Connect the OUTPUT connector of the PB amplifier tool to CN10 of the MB-157 Board.
- (5) Disconnect the connector of the brush on the Drum. Connect the connector of the harness to 3P connector of the PB amplifier tool.
- (6) Short between TP16 and GND on the SV-94P Board with a shorting clip.
- (7) Short between pin8 of CN12 and GND on the SV-94P Board with a shorting clip.
- (8) Remove the MDM-3P Board and extend it with an extension board.
- (9) Connect the oscilloscope as follows;  
CH-1:TP301/MDM-3P Board  
EXT. TRIG:TP308/MDM-3P Board
- (10) Tap the bottom of the alignment tape on a hard surface lightly two or three times so that the tape is positioned to the lower side in the reel hub of the cassette tape. (For stable video tracking adjustment)
- (11) Play back the alignment tape.

### Check procedure:

- (1) When turning the TRACKING volume, check that the RF waveform maintains a flat envelope while the amplitude increases and decreases.
- (2) Turn the TRACKING volume, so that the RF envelope waveform has the maximum amplitude.  
Check that the RF envelope waveform fluctuation and the tape-to-head contact are within the specification.
- (3) Check that the type curls at the Tension Regulator, Entrance Guide and Exit Guide meet the required specification.

### <PLAY Mode>



#### Spec.:

head-to-tape contact

$$\frac{B}{A} \geq 0.8 \quad \frac{C}{A} \geq 0.8$$

fluctuation

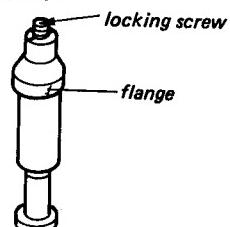
$$\frac{D}{A} \geq 0.9 \quad \frac{E}{B} \geq 0.9 \quad \frac{F}{C} \geq 0.9$$

### < FWD or REV SEARCH Mode >

#### Spec.:

The RF waveform of entrance side meets the specification at the SEARCH mode.

### < Tape Guide Adjustment >



(4) Put the unit into the FWD and REV SEARCH mode. Check that the tape-to-head contact is within the specification.

**Adjustment procedure:**

- When adjusting the tape guide height.

- Loosen the locking screw about 2 to 3 turns.

- Turn the flange and adjust the height.

- After the adjustment, tighten the locking screw and check again.

- When the tracking at the drum entrance side is not good.

- Make the RF envelope amplitude 70 to 80% of the maximum amplitude by turning the TRACKING volume.

- Loosen the locking screw of the Entrance Guide. Turn the flange of the Tape Guide so that the tape does not contact with the flange.

- Adjust the height of the roller guide of the Tension Regulator so that the tape runs in contact with the upper flange and RF envelope is flat simultaneously.

- Adjust the height of the Entrance Guide so that it meets the following requirements.

- Tape should run without any tape curl at the upper flange of the Tension Regulator.

- Tape should run in contact with the lead of the Drum.

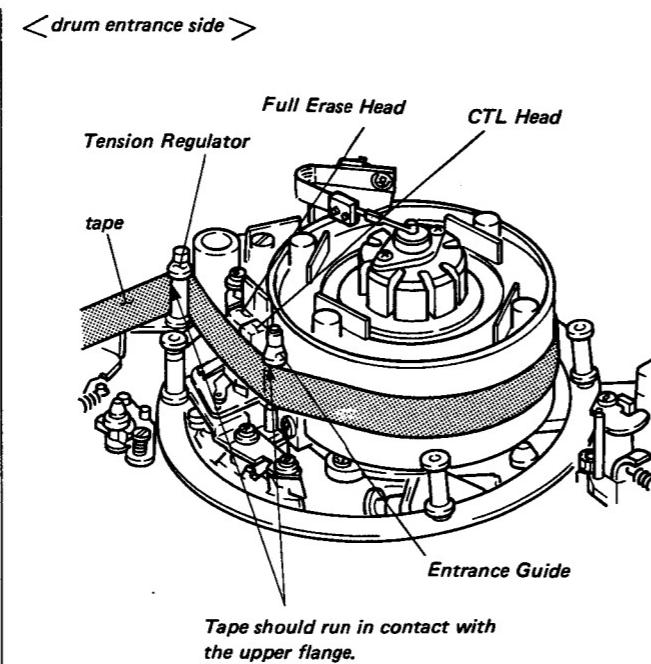
- RF envelope waveform should be flat.

- Tape should run in contact with the upper flange of the Entrance Guide.

(Acceptable range of the tape curl at the upper flange is less than 1/10 of the tape width.)

- Put the unit into the FWD and REV SEARCH mode. Check that the tape runs without any tape curl at the flanges of the Tension Regulator and the Entrance Guide and at the lead of the Drum.

(Acceptable range of the tape curl at the upper flange of the Entrance Guide is less than 1/10 of the tape width.)



(6) Repeat the Steps (1) to (5) so that meets the required specification.

. When the tracking at the drum's exit side is not good.

- Make the RF envelope waveform 70 to 80% of the maximum amplitude by turning the TRACKING volume.

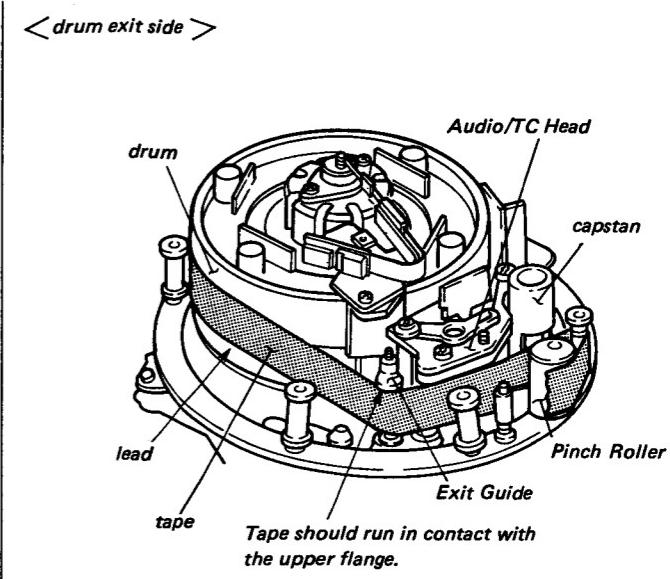
- Adjust the height of the Exit Guide so that the tape runs in contact with the lead of the Drum and RF envelope is flat simultaneously.

(Acceptable range of the tape curl at the upper flange of Exit Guide is less than 1/10 of the tape width.)

- Put the unit into the FWD and REV SEARCH mode. Check that the tape runs without any tape curl at the flange of the Exit Guide and the lead of the Drum.

(Acceptable range of the tape curl at the upper flange of Exit Guide is less than 1/10 of the tape width.)

- Perform the check procedures again.



## 7-6. CTL HEAD HEIGHT ADJUSTMENT

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR8-1BPS

Oscilloscope

### Preparation:

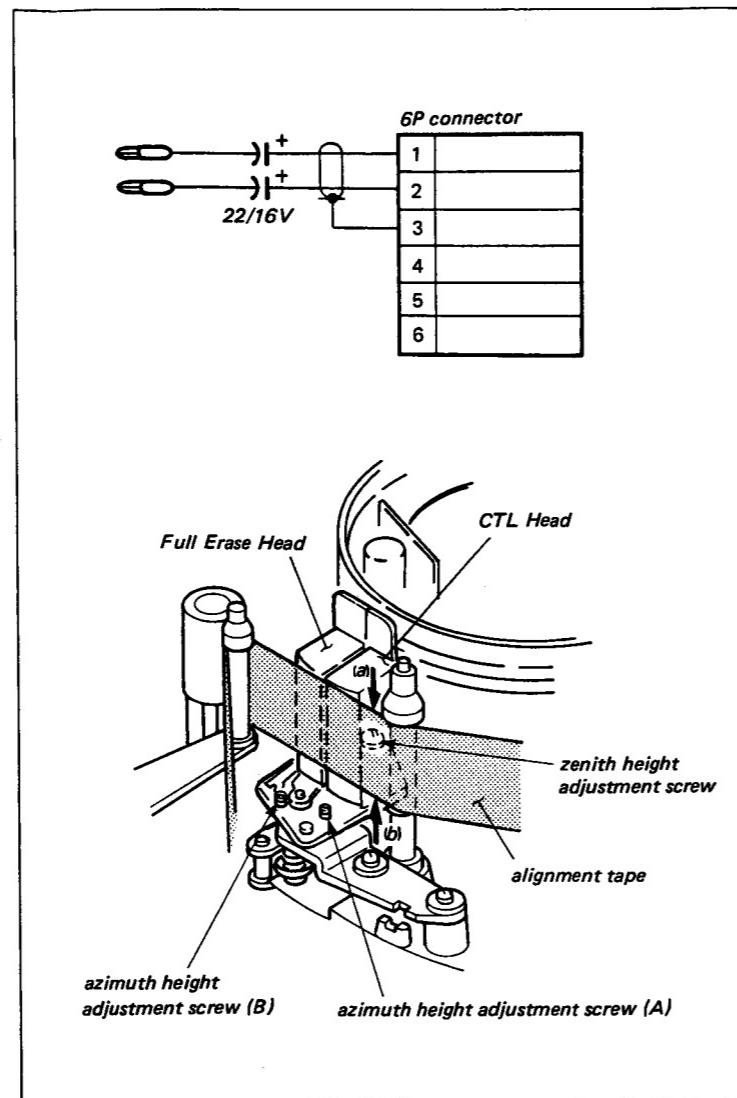
- (1) Make the special connector as shown in the figure.
- (2) Disconnect the CN3 on the AU-93P Board.
- (3) Connect the special connector as follows;
  - . Connect the clip from pin 1 to pin 1 of IC3 on the SV-94P Board.
  - . Connect the clip from pin 2 to pin 4 of IC3 on the SV-94P Board.
  - . Connect the 6P connector to CN3 on the AU-93P Board.
- (4) Connect the oscilloscope to the AUDIO CH-1 OUT connector on the connector panel.
- (5) Insert the alignment tape. Playback the audio 1 kHz signal portion recorded on the CTL track on the alignment tape.

### Check procedure:

- (1) When pressing down the tape at (a) portion, or when pushing up the tape at (b) portion, check that the levels both decrease. If the levels increase, the following adjustments are necessary.

### Adjustment procedure:

- . When the levels increase while pressing down the tape at (a) portion.
- (1) Turn the azimuth height adjustment screws (A) and (B) in the clockwise direction. Turn the zenith height adjustment screw an exactly equal amount in the counterclockwise direction. Adjust the maximum output waveform.
- . When the levels increase while pushing up the tape at (b) portion.
- (2) Turn the azimuth height adjustment screws (A) and (B) in the counterclockwise direction. Turn the zenith height adjustment screw an exactly equal amount in the clockwise direction. Adjust the maximum output waveform.
- (3) Remove the check tools.



## 7-7. CTL HEAD POSITION ADJUSTMENT

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1BPS

Dual trace oscilloscope

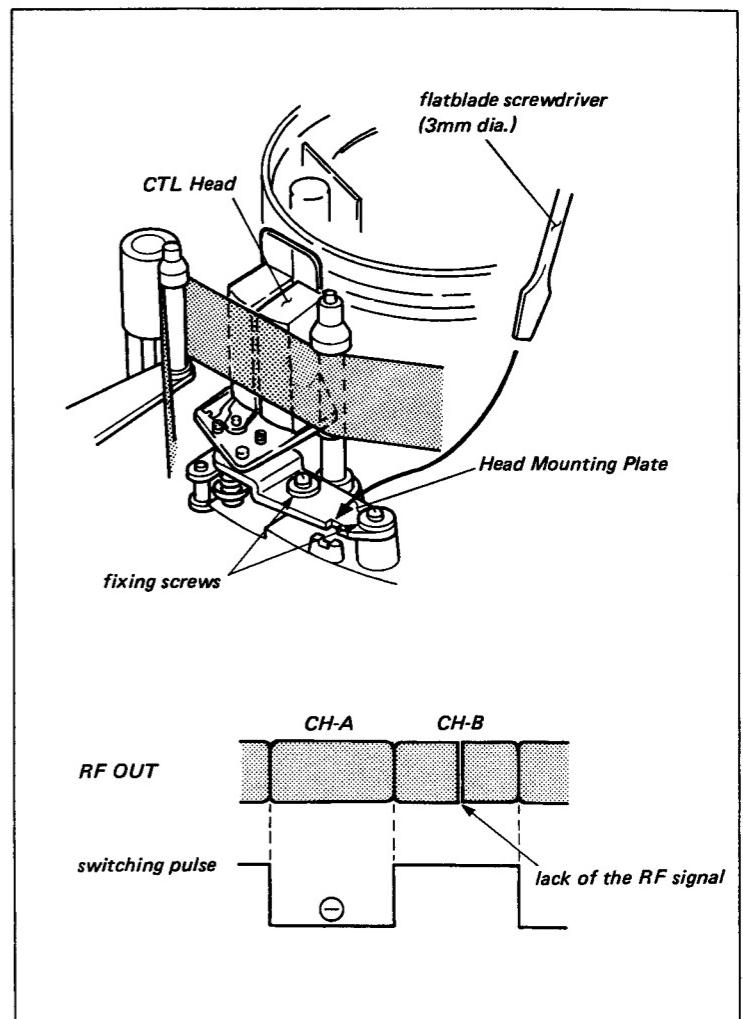
PB amplifier tool

### Preparation:

- (1) Connect the video signal to the VIDEO IN terminal on the Connector Panel.
- (2) Disconnect CN403 of the VRA-1 Board.
- (3) Connect the connector of the harness to the INPUT connector of the PB amplifier tool.
- (4) Disconnect CN10 of the MB-157 Board.
- (5) Connect the OUTPUT connector of the PB amplifier tool to CN10 of the MB-157 Board.
- (6) Disconnect the connector of the brush on the Drum. Connect the connector of the harness to 3P connector of the PB amplifier tool.
- (7) Short between TP16 and GND on the SV-94P Board with a shorting clip.
- (8) Remove the MDM-3P Board and extend it with an extension board.
- (9) Connect the oscilloscope as follows;  
CH-1:TP301/MDM-3P Board  
CH-2:TP308/MDM-3P Board  
EXT. TRIG:TP308/MDM-3P Board
- (10) Play back the alignment tape.

### Adjustment procedure:

- (1) Turn the TRACKING volume to the clicked position.
- (2) Loosen the two fixing screws about 1/4 to 1/2 turn. Insert a flatblade screw driver (3 mm dia.) into the notch of the Head Mounting Plate and adjust the maximum output at the center of the waveform.
- (3) Remove the video signal after the fixing screw is tightened, short between pin 8 of CN12 on the SV-94P board and GND with a shorting clip. Turn the TRACKING volume so that the RF envelope waveform has the maximum amplitude. Check that the level of the RF envelope waveform is the same level as the above procedure (2).
- (4) Remove the tool and the shorting clip.



## 7-8. CTL HEAD PHASE CHECK

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1BPS

PB amplifier tool

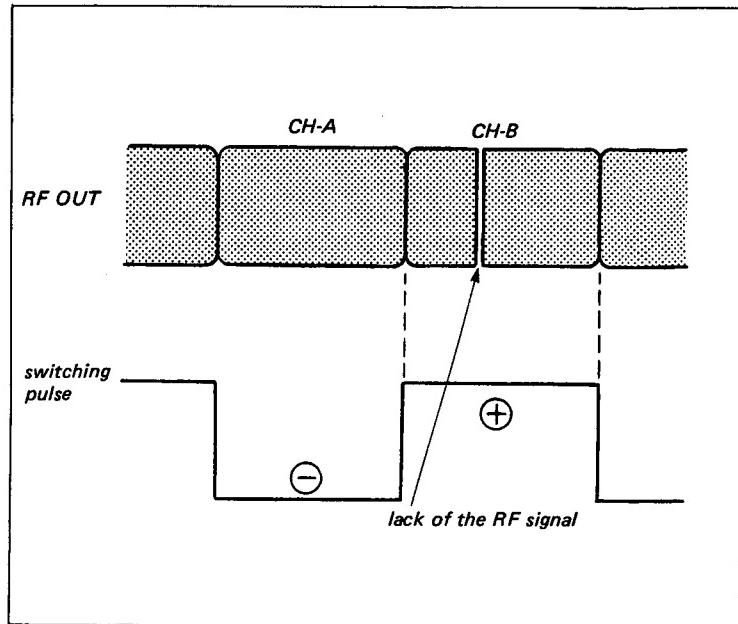
Dual trace oscilloscope

### Preparation:

- (1) Disconnect the CN403 of the VRA-1 Board.
- (2) Connect the connector of the harness to the INPUT connector of the PB amplifier tool.
- (3) Disconnect CN110 of the MB-157 Board.
- (4) Connect the OUTPUT connector of the PB amplifier tool to CN110 of the MB-157 Board.
- (5) Disconnect the connector of the brush on the Drum. Connect the connector of the harness to 3P connector of the PB amplifier tool.
- (6) Short between TP16 and GND on the SV-94P Board with a shorting clip.
- (7) Connect the oscilloscope as follows;  
CH-1 : TP301/MDM-3P Board  
CH-2 : TP308/MDM-3P Board  
EXT. TRIG : TP308/MDM-3P Board
- (8) Play back the alignment tape.

### Check procedure:

- (1) Check that the waveform of TP301 and TP308 meets the required specification.



## 7-9. FULL ERASE HEAD TAPE-TO-HEAD CONTACT ADJUSTMENT

Mode: PLAY

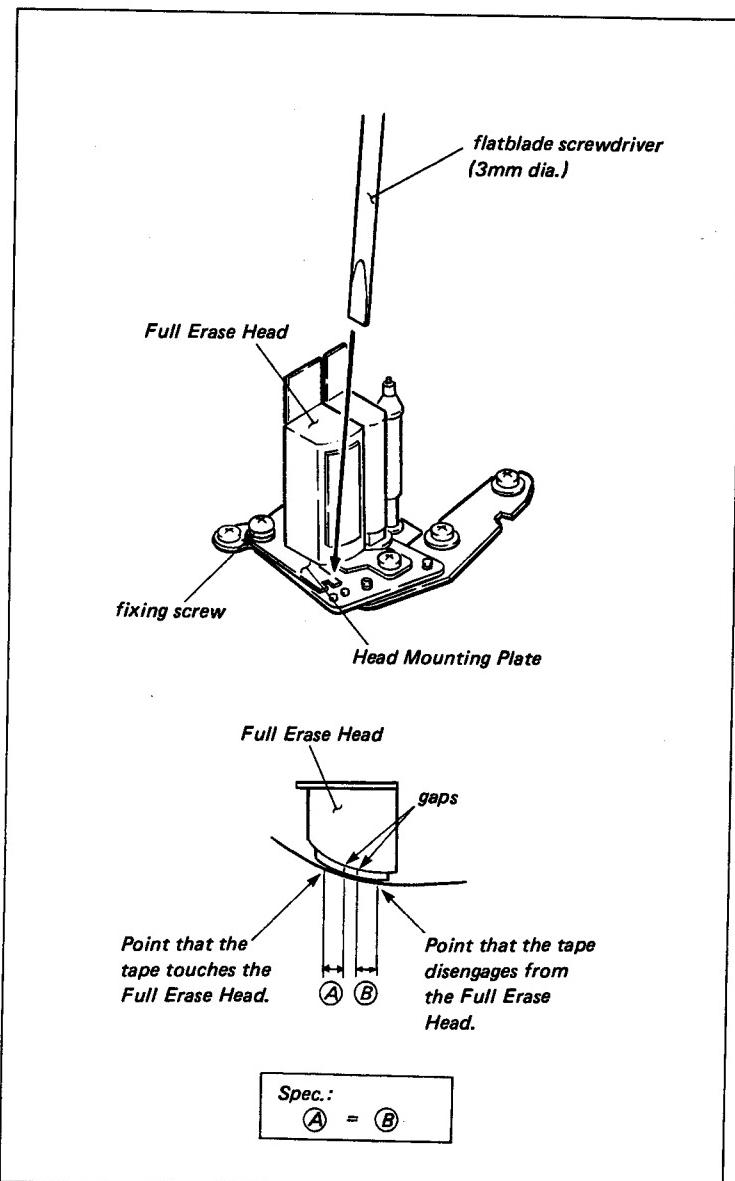
Tool: Cassette tape, BCT-20K

Check procedure:

- (1) Insert a cassette tape, and put the unit into the PLAY mode.
- (2) When observing the FE Head from right above, check that the amount of overlap  
Ⓐ is equal to the amount of overlap  
Ⓑ

Adjustment procedure:

- (1) Loosen the fixing screw of the FE Head 1/2 to 1 turn.
- (2) Insert a flatblade screwdriver (3 mm dia.) into the notch of the Head Mounting Plate. Adjust so that the amount of overlap meets the specification
- (3) Tighten the fixing screw, and check again.



## 7-10. AUDIO HEAD HEIGHT ADJUSTMENT

**Mode:** Playback the asignment tape

**Tool:** Alignment tape, CR8-1BPS

Dual trace oscilloscope

### Preparation:

- (1) Connect the oscilloscope as follows;  
CH-1 : AUDIO OUT CH-1/connector panel  
CH-2 : AUDIO OUT CH-2/connector panel
- (2) Insert the alignment tape, and play back the audio 1kHz signal which is recorded on the end of the alignment tape.

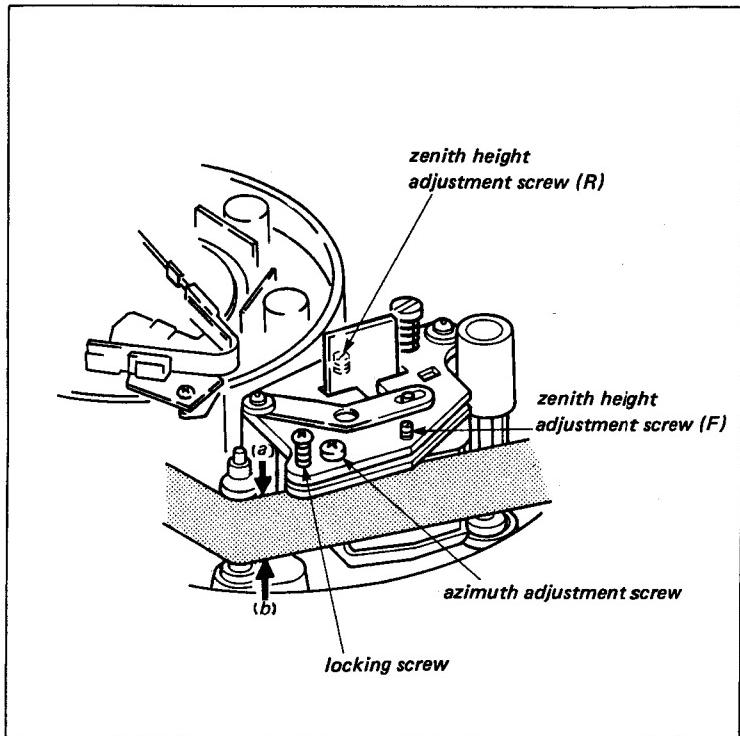
**Note:** Be sure not to play back the 1kHz signal which is recorded on the beginning portion of the alignment tape.

### Check procedure:

- (1) Check that the output level decreases when pressing down at (a) portion.
- (2) Check that the output level decreases when pushing up at (b) portion.

### Adjustment procedure:

- When the output level increases while pressing down at (a).
  - (1) Loosen the locking screw. Adjust the maximum output by turning the zenith height adjustment screws (R) and (F) exactly equal amounts in counterclockwise direction and turn the azimuth adjustment screw of an exactly equal amount in clockwise direction.
  - (2) After the adjustment, tighten the locking screw, and check again.
  - When the level increases while pushing up at (b).
    - (3) Adjust the maximum output by turning the zenith height adjustment screws (R) and (F) exactly equal amounts in clockwise direction and turn the azimuth adjustment screw an exactly equal amount in counterclockwise direction.
    - (4) After the adjustment, tighten the locking screw, and check again.



## 7-11. AUDIO HEAD AZIMUTH ADJUSTMENT

**Mode:** Playback the alignment tape

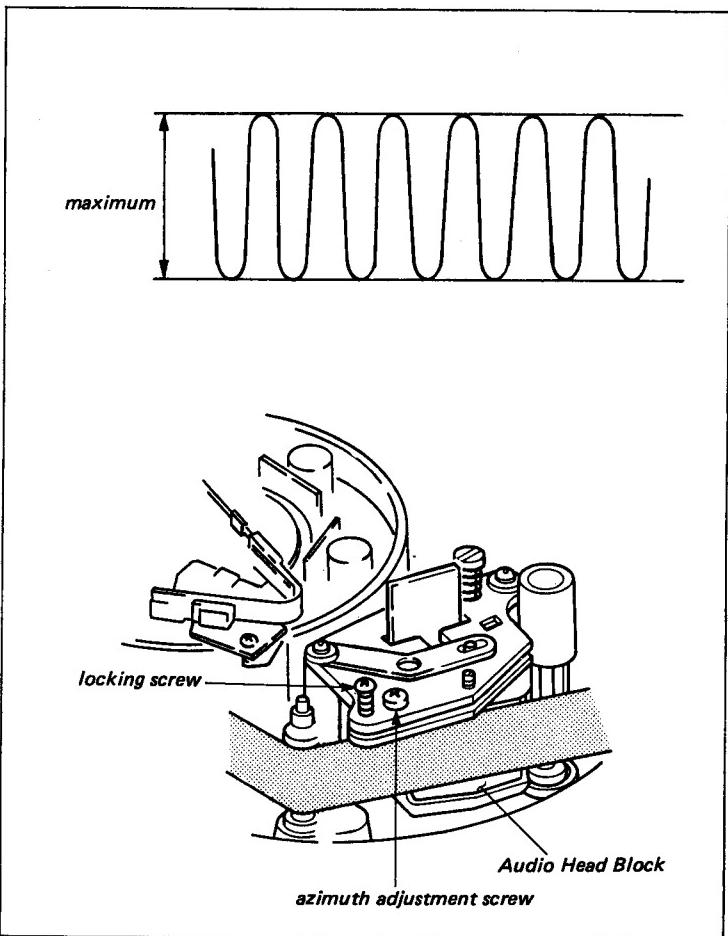
**Tool:** Alignment tape, CR8-1BPS  
Dual trace oscilloscope

**Preparation:**

- (1) Connect the oscilloscope as follows;  
CH-1 : AUDIO OUT CH-1/connector panel  
CH-2 : AUDIO OUT CH-2/connector panel
- (2) Insert the alignment tape, and play back the audio 15 kHz portion.

**Adjustment procedure:**

- (1) Loosen the fixing screw about two or three turns.
- (2) Turn the azimuth adjustment screw so that the output waveform has the maximum amplitude.
- (3) Tighten the fixing screw, and check again.



## 7-12. AUDIO HEAD PHASE ADJUSTMENT

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR8-1BPS

Dual trace oscilloscope

### Preparation:

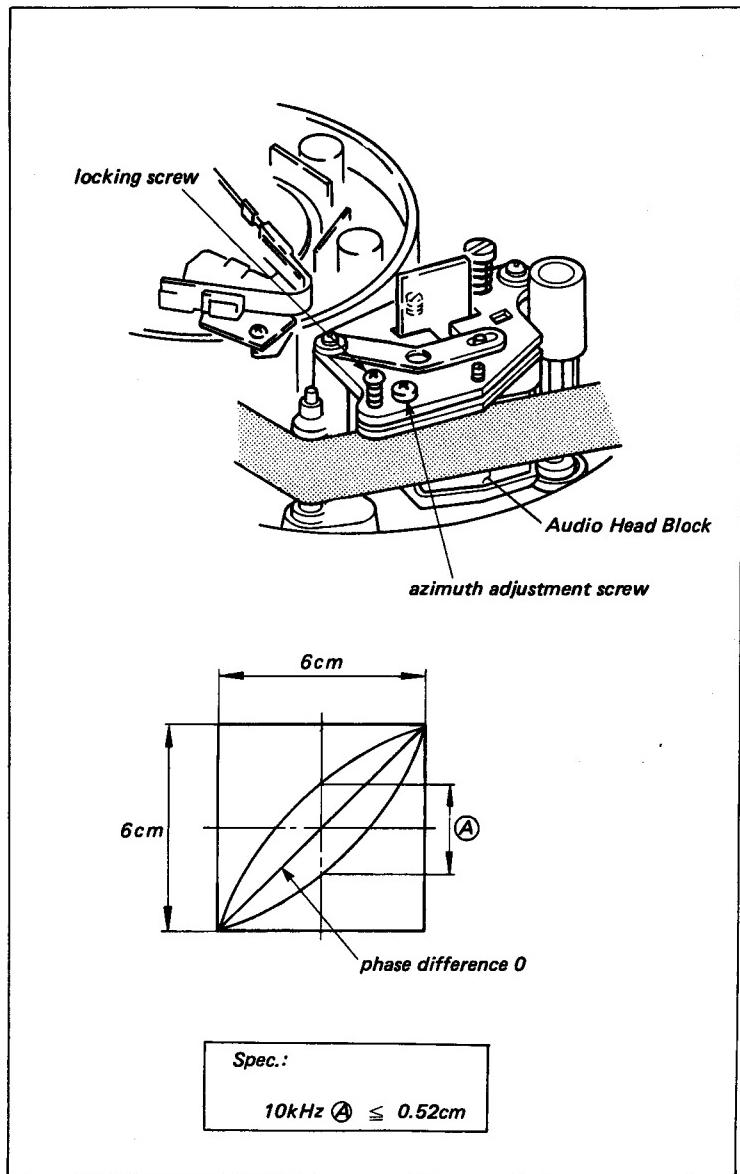
- (1) Connect the HORIZONTAL and VERTICAL terminals of oscilloscope to the AUDIO OUT CH-1 and CH-2 connectors.
- (2) Insert the alignment tape, and playback the audio 15 kHz portion.
- (3) Adjust the scope for horizontal and vertical amplitudes of 6 cm of a lissajous waveform.

### Check procedure:

- (1) Check that the vertical amplitude at the center in the horizontal direction is within the specification.

### Adjustment procedure:

- (1) Loosen the locking screw about 1/4 to 1/2 turn.
- (2) Adjust the phase by turning the azimuth adjustment screw so that it meets the required specification.
- (3) Tighten the locking screw and check again.



### 7-13. TC HEAD POSITION ADJUSTMENT

- It is required that the Section 7-7, CTL head position adjustment is correct before initiating this adjustment.

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1BPS

Dual trace oscilloscope

Eccentricity driver (4 mm dia.)

**Preparation:**

- Connect the oscilloscope as follows;

CH-1 : TP1/TC-45P Board

CH-2 : TP21/SV-94P Board

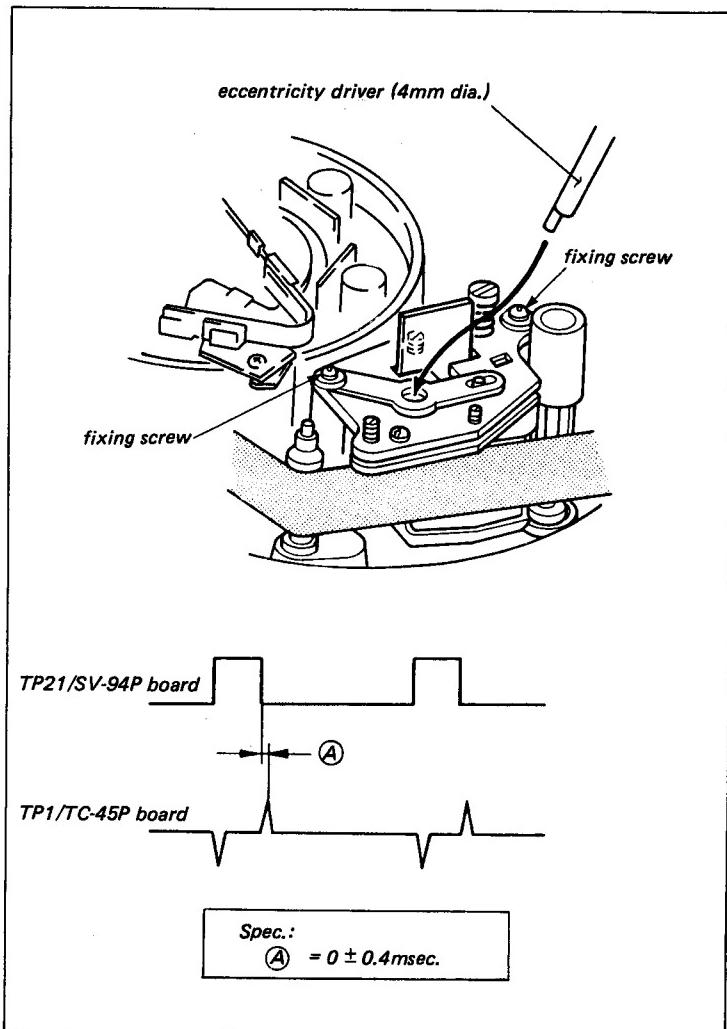
- Play back the alignment tape.

**Check procedure:**

- Check that the waveform meets the required specification.

**Adjustment procedure:**

- Loosen the fixing screws.
- Adjust the position of the TC head so that it meets the required specification with the eccentricity driver (4 mm dia.).



## 7-14. VIDEO HEAD DIHEDRAL ADJUSTMENT

### 7-14-1. Video PB Head Dihedral Adjustment

- Perform this adjustment only for the Y head.
- As the reference head is CH-A, perform the adjustment in CH-B.

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR5-2A PS

Monitor TV

Dihedral adjustment screw (two pieces)

**Preparation:**

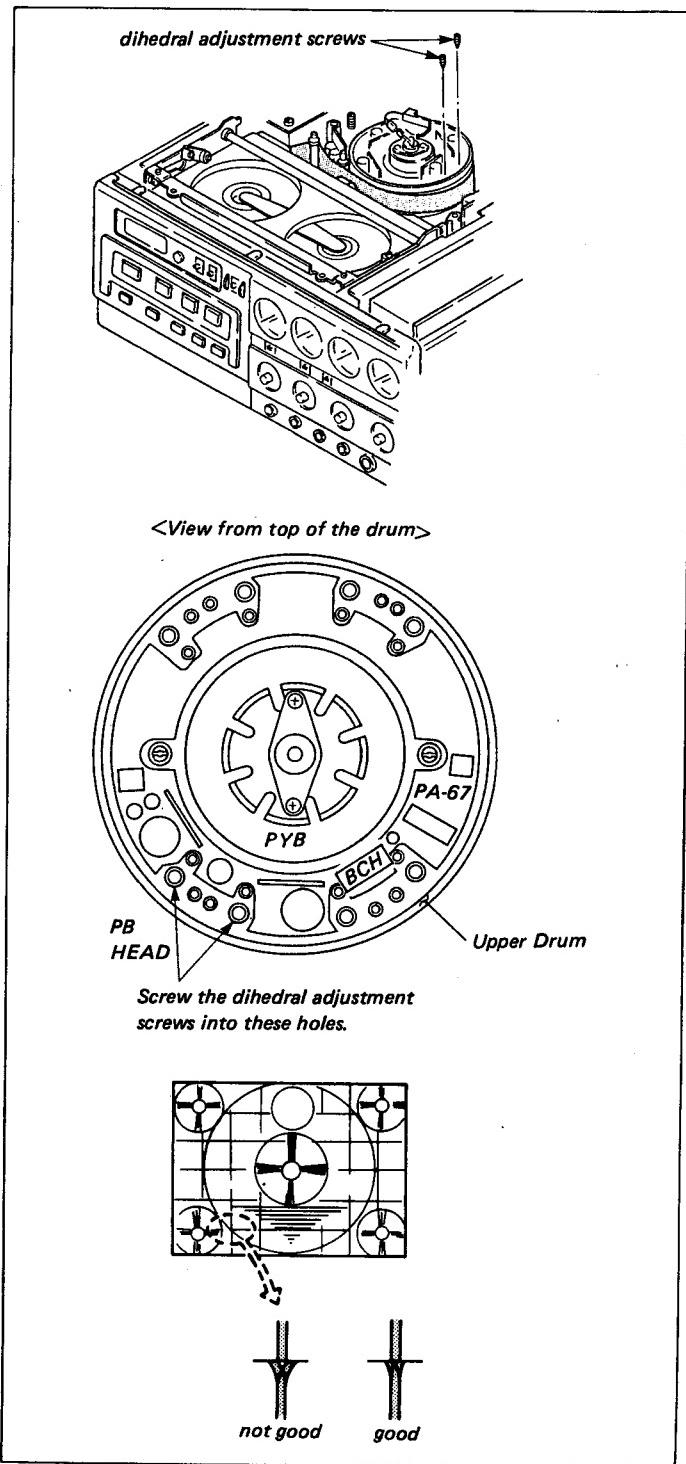
- (1) Connect the monitor TV to the Connector Panel.
- (2) Insert the alignment tape and play back the monoscope signal of the alignment tape (for dihedral adjustment).

**Check procedure:**

- (1) Check the vertical line beneath the switching point visually on a monitor. If the vertical line does not split into two lines, it meets the specification.

**Adjustment procedure:**

- (1) Screw the two dihedral adjustment screws into the adjustment holes as shown in the figure until some resistance is felt.
- (2) If this screw is turned further, the video head is moved and the dihedral is adjusted. Therefore, turn this screw an additional quarter turn.
- (3) Play back the alignment tape, and check the dihedral distortion. If the distortion has become worse, loosen this adjustment screw about one turn. Tighten the other adjustment screw (on the opposite side of the video head) so that the distortion meets the specification.
- (4) Remove the two dihedral adjustment screws. Play back the alignment tape, and check the dihedral again.



## 7-14-2. Video REC Head Dihedral Adjustment

- It is required that the Sec. 7-14-1, Video PB head dihedral adjustment is correct before initiating this adjustment.
- Perform this adjustment only for the Y head.

**Mode:** REC/PB

**Tool:** Cassette tape, BCT-20K

Monitor TV

Dihedral adjustment screw (two pieces)

### Preparation:

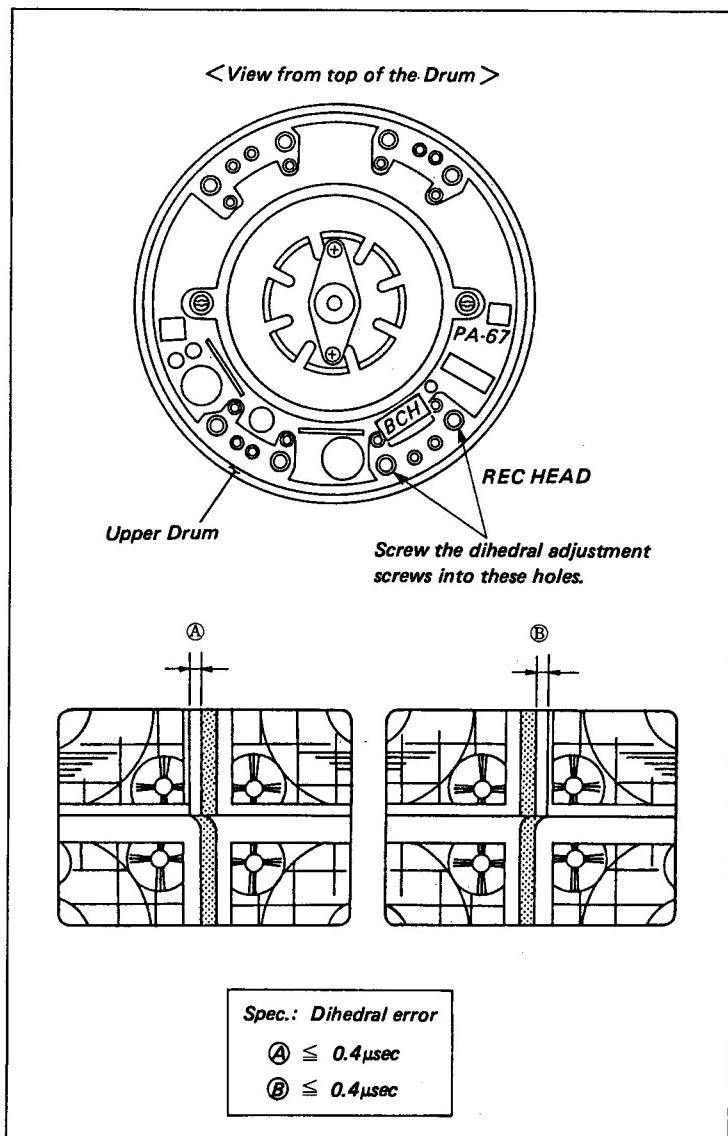
- Connect the monitor TV to the VIDEO OUT terminal on the Connector Panel.
- Connect the video signal to the VIDEO IN terminal on the Connector Panel.
- Put the monitor TV into the pulse-cross mode.
- Insert a cassette tape.

### Check procedure:

- Record the video signal.
- Play back the video signal.
- Check that the distortion of the sync meets the specification.

### Adjustment procedure:

- Screw the two dihedral adjustment screws into the adjustment holes as shown in the figure until some resistance is felt.
- When turning the adjustment screw further, the dihedral can be adjusted.
- Perform the check procedures (1) and (2). Check that the distortion of the sync meets the specification.
- When the distortion of the sync increases after the adjustment.
- Loosen the dihedral adjustment screw about one turn.
- Tighten the other adjustment screw (on the opposite side of the video head). Adjust so that the dihedral meets the specification.
- Perform the check procedures (1) and (2). Repeat the adjustment procedures (1) to (5) until the dihedral meets the specification.
- Remove the dihedral adjustment screws, and check again.



*Spec.: Dihedral error*

(A)  $\leq 0.4\mu\text{sec}$

(B)  $\leq 0.4\mu\text{sec}$

## 7-15. CTL DELAY ADJUSTMENT

### 7-15-1. CTL Delay Adjustment (without sync)

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1PS

Dual trace oscilloscope

#### Preparation:

- (1) Check that the video signal is not connected to the VIDEO IN terminal on the Connector Panel.
- (2) Connect the oscilloscope as follows;  
CH-1 : TP301/MDM-3P Board  
EXT. TRIG : TP308/MDM-3P Board
- (3) Play back the alignment tape.

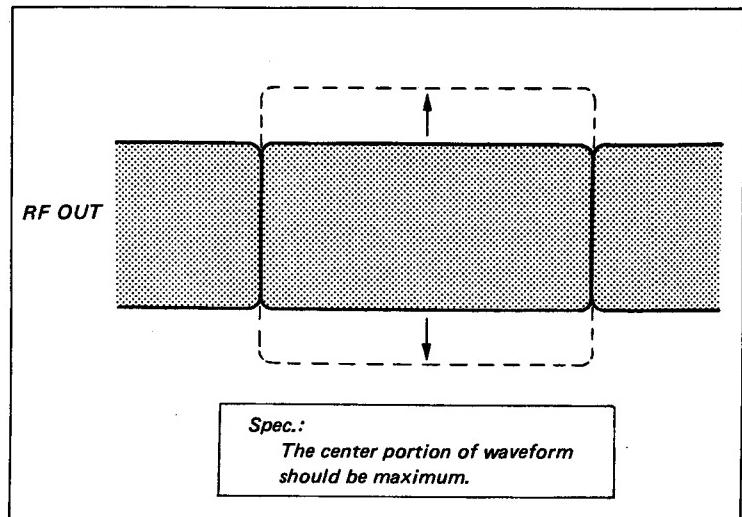
**Note:** Be sure not to supply the video signals to the VIDEO IN connector.

#### Check procedure:

- (1) Turn the TRACKING volume to the clicked position.
- (2) Check that the center of the RF envelope waveform has the maximum amplitude.

#### Adjustment procedure:

- (1) Adjust RV9 on the SV-94P Board so that the RF envelope waveform meets the specification.



### 7-15-2. CTL Delay Adjustment (with sync)

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1PS

Dual trace oscilloscope

#### Preparation:

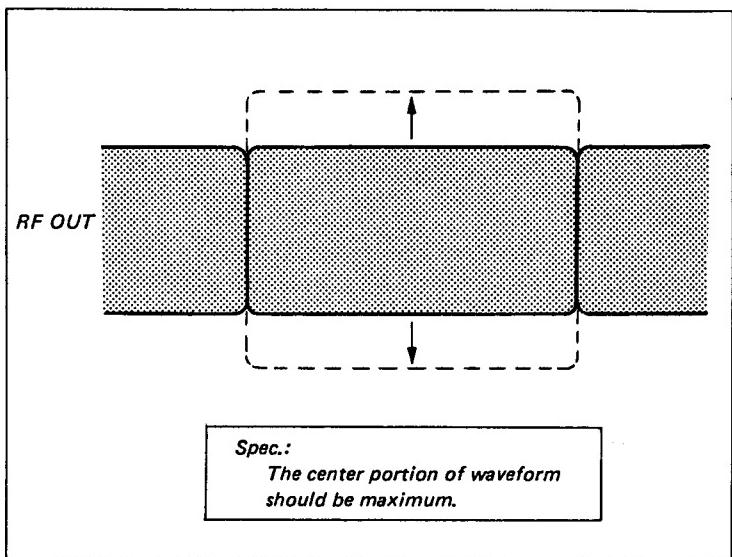
- (1) Connect the video signal to the VIDEO IN terminal on the Connector Panel.
- (2) Connect the oscilloscope as follows;  
CH-1: TP301/MDM-3P Board  
EXT. TRIG : TP308/MDM-3P Board
- (3) Play back the alignment tape.

#### Check procedure:

- (1) Turn the TRACKING volume to the clicked position.
- (2) Check that the center of the RF envelope waveform has the maximum amplitude.

#### Adjustment procedure:

- (1) Adjust RV14 on the SV-94P Board so that the RF envelope waveform meets the specification.



## 7-16. SWITCHING POSITION ADJUSTMENT

### 7-16-1. Video PB Head Switching Position Adjustment

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1BPS  
Oscilloscope

**Preparation:**

(1) Remove the MDM-3P Board and extend it with an extension board.

(2) Connect the oscilloscope as follows;  
. Y CH;

CH-1 : TP301/MDM-3P Board  
EXT. TRIG : TP308/MDM-3P Board

. CHROMA CH;  
CH-1 : TP401/MDM-3P Board  
EXT. TRIG : TP408/MDM-3P Board

(3) Play back the alignment tape.

**Check procedure:**

(1) Check that the CH-A and CH-B RF envelopes meet the specification at the switching pulse position.

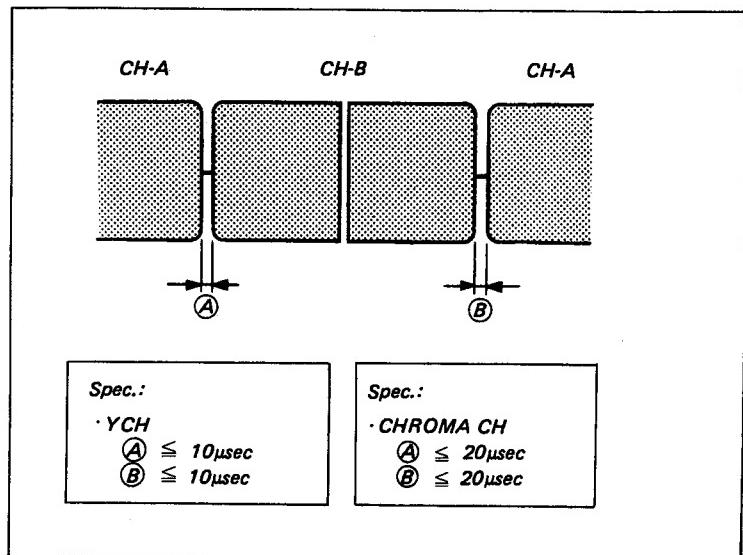
**Adjustment procedure:**

. Y CH;

(1) Adjust RV2 on the SV-94P Board so that it meets the required specification.

. CHROMA CH;

(2) Adjust RV6 on the SV-94P Board so that it meets the required specification.



## 7-16-2. Video REC Head Switching Position Adjustment

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1BPS

PB amplifier tool

Dual trace oscilloscope

### Preparation:

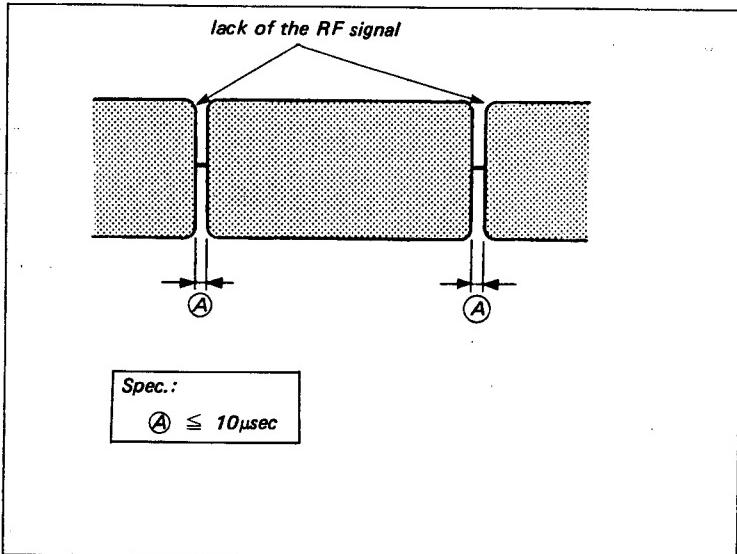
- (1) Disconnect the CN403 of the VRA-1 Board.
- (2) Connect the connector of the harness to the INPUT connector of the PB amplifier tool.
- (3) Disconnect the CN110 of the MB-157 Board.
- (4) Connect the OUTPUT connector of the PB amplifier tool to CN110 of the MB-157 Board.
- (5) Disconnect the connector of the brush on the Drum. Connect the connector of the harness to 3P connector of the PB amplifier tool.
- (6) Short between TP16 and GND on the SV-94P Board with a shorting clip.
- (7) Connect the oscilloscope as follows;  
CH-1 : TP301/MDM-3P Board  
EXT. TRIG : TP308/MDM-3P Board
- (8) Play back the alignment tape.

### Check procedure:

- (1) Turn the TRACKING volume to the clicked position.
- (2) Check that the output waveform of RF envelope meets the specification at the switching pulse position.

### Adjustment procedure:

- (1) Adjust RV3 on the SV-94P Board so that it meets the required specification.



### 7-16-3. Video CONFI Head Switching Position Adjustment

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1BPS

Dual trace oscilloscope

#### Preparation:

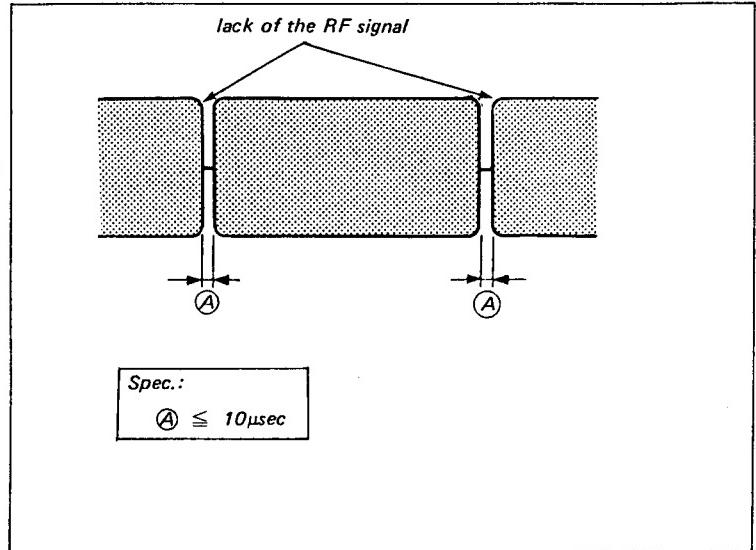
- (1) Short between pin 8 of CN12 and GND on the SV-94P Board with a shorting clip.
- (2) Short between TP16 and GND on the SV-94P Board with a shorting clip.
- (3) Connect the oscilloscope as follows;  
CH-1:TP301/MDM-3P Board  
CH-2:TP308/MDM-3P Board  
EXT.TRIG:TP308/MDM-3P Board

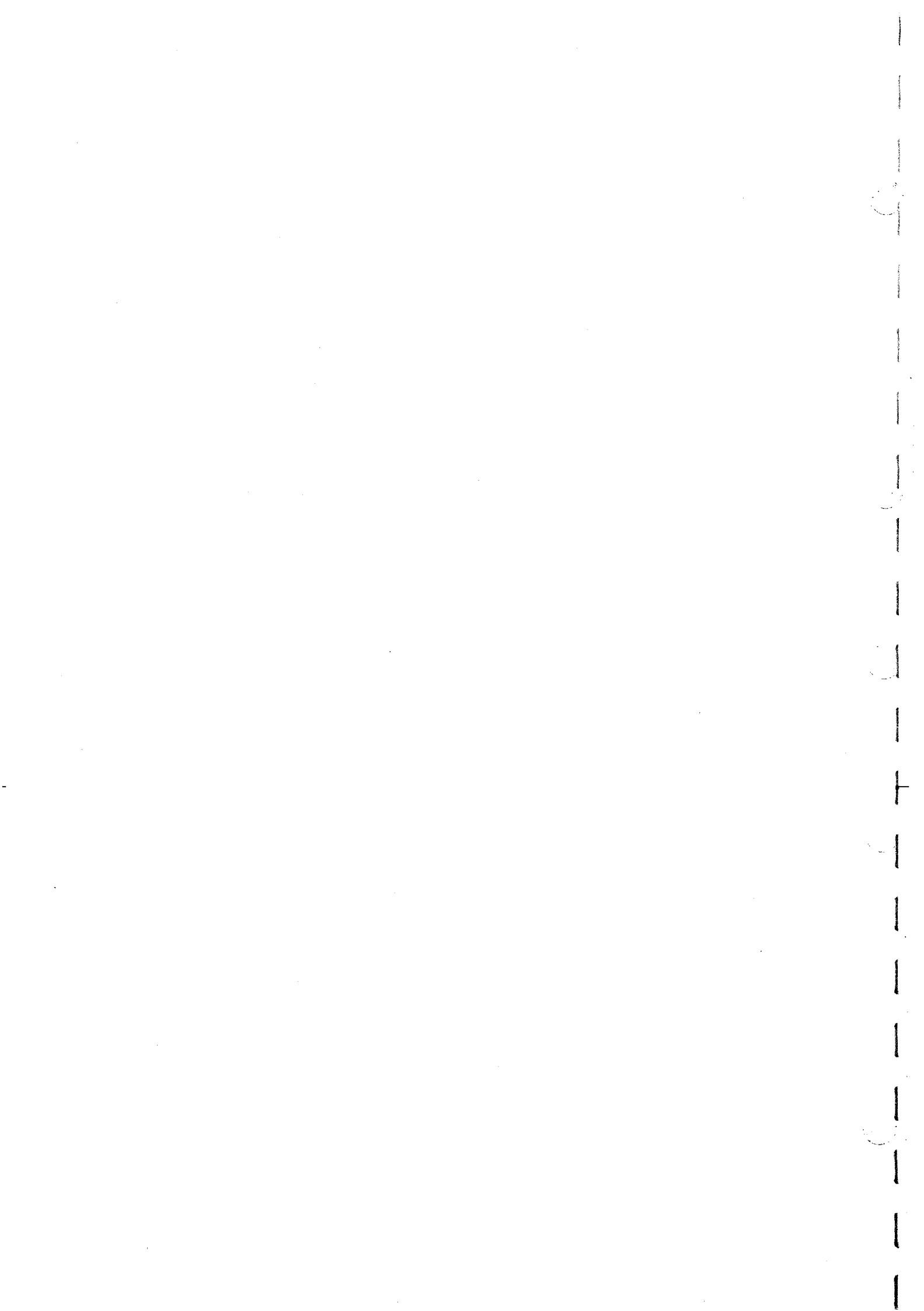
#### Check procedure:

- (1) Play back the alignment tape.
- (2) Check that the output waveform of RF envelope meets the specification at the switching pulse position.

#### Adjustment procedure:

- (1) Adjust RV5 on the SV-94P Board so that it meets the required specification.





## SECTION 8

### POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

**[Equipment Required]**

- Oscilloscope
- Blank tape (BCT-20K or the equivalent)
- Variable voltage power supply
- DC voltmeter
- PAL signal generator (TEKTRONIX 1411 or equivalent)
- Audio noise meter

#### **8-1. POWER SUPPLY CHECK**

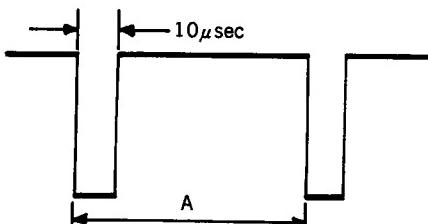
Be sure to perform the following check when repairing or replacing a DC-DC converter.

##### **8-1-1. DC-DC Converter Voltage Check**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• DC voltmeter</li> </ul>	TP1/MB-157(G-1) +12.0±0.2 V TP2/MB-157(D-2) +9.2±0.2 V TP3/MB-157(B-5) +5.1±0.2 V TP4/MB-157(B-4) -5.15±0.2 V TP5/MB-157(G-1) -12.05±0.2 V	

#### **8-2. SYSTEM CONTROL ALIGNMENT**

##### **8-2-1. Battery Before/End Voltage Adjustment**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• SAVE, PB/EE, PB select sw: SAVE (on the connector panel)</li> <li>• Turn RV1 on the SY-110 Board (J-1) fully clockwise direction.</li> <li>• EXT DC IN: <math>10.540 \pm 0.005</math> V (from variable voltage power supply)</li> <li>• POWER SW: ON</li> </ul>	TP21/SY-110(C-1)  A ≈ 16 msec	<p>• RV1/SY-110(J-1)  Turn RV1 counter-clockwise direction little by little, and adjust to the point that the negative pulse is generated.</p>

### 8-2-2. Battery Meter Calibration Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>Supply <math>11.00 \pm 0.01</math> Vdc voltage to the battery terminal.</li> <li>Insert a BCT-20 K cassette tape.</li> <li>REC mode</li> <li>Put the unit vertically.</li> <li>Meter select sw: BATT</li> </ul>	<p>AUDIO CH-2/TRACK/BATT meter</p> <p>Make a slight gap between the pointer and green belt. (within a pointer width)</p>	●RV13/MT-34 (F-1)

### 8-2-3. Alarm Tone Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Insert a BCT-20k cassette tape.</li> <li>Put the unit into the FF mode and set to tape end portion.</li> </ul>	Confirm that the TAPE END lamp on the front panel lights.	
<ul style="list-style-type: none"> <li>Maximize the Alarm Tone level with RV2 on the SY-110 Board (C-1).</li> <li>Record this level of HEAD PHONES OUTPUT connector.</li> </ul>	<p>HEADPHONES OUTPUT connector (terminated by <math>8\Omega</math>)</p> <p>Lower the level by 6dB than recorded level. &lt;Reference&gt;</p> <p>It is possible to adjust until the proper level as user's request.</p>	●RV2/SY-110 (C-1)

## SECTION 9

### SERVO SYSTEM ALIGNMENT

**[Equipment Required]**

- Square-wave oscillator
- DC voltmeter
- Dual-trace oscilloscope
- Frequency counter
- Monitor
- Shorting clip
- PB amplifier jig (J-6331-120-A)
- Blank tape (BCT-20K)
- Alignment tape CR2-1BPS (8-960-096-51)

**Contents**

VIDEO TRACK	AUDIO TRACK	TIME CODE TRACK	CTL TRACK
Y ; 6 MHz signal C ; 5 MHz signal	Blank	CTL	CTL

- Alignment tape CR5-2A PS (96-0098-44)

**Contents**

TIME min. sec	VIDEO TRACK
0: 00	75% Color Bars
3: 00	Multi Burst
6: 00	Bowtie & 10T
9: 55	Pulse & Bar
11: 00	Quad Phase
13: 00	C-Monoscope Switching position is shifted.
15: 00	

- Alignment tape CR8-1A PS (96-0098-45)

**Contents**

TIME min. sec	AUDIO TRACK
0: 00	1kHz, 0VU
2: 55	Blank
3: 00	10kHz, -10VU
4: 55	Blank
5: 00	1kHz, -20VU
5: 55	Blank
6: 00	40Hz 7kHz 10kHz 15kHz
7: 55	Blank
8: 00	1kHz, 0VU AUDIO CH-1, CH-2 CTL
10: 00	

**[VIDEO IN]**

- When performing the servo system alignment, supply standard video signal to the VIDEO IN.

## 9-1. FF/REW SPEED TENTATIVE ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Press the cassette-in switch without inserting a cassette tape and put the unit into the THREADING mode.</li> <li>• Place the unit prepndecular to the floor.</li> <li>• REW mode</li> <li>• DC voltmeter</li> </ul>	TP6/SD-16P (E-1)  7.0±0.1 Vdc	● RV23/SV-94P (K-2)

## 9-2. FF REEL SEND CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode.</li> <li>• Place the unit prepndecular to the floor.</li> <li>• Connect TP33 on the SV-94P Board (K-3) to GND with a shorting clip.</li> <li>• Supply 800 Hz, 5 Vp-o square-wave signal to TP34 on the SV-94P Board (K-3).</li> <li>• FF mode</li> <li>• DC voltmeter</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	Positive (+) side : TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (D-2)  45±2 mVdc	● RV31/SV-94P (L-3)

### 9-3. REW REEL SEND CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode.</li> <li>• Place the unit perpendicular to the floor.</li> <li>• Connect TP31 on the SV-94P Board (K-3) to GND with a shorting clip.</li> <li>• Supply 800 Hz, 5 Vp-o square-wave signal to TP32 on the SV-94P Board (K-3).</li> <li>• REW mode</li> <li>• DC voltmeter</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	Positive (+) side : TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)  $68 \pm 2$ mVdc	• RV28/SV-94P (K-3)

### 9-4. ×1/30 TOP REW ADJUSTMENT (AT THE TAKE-UP REEL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Set the pre-recorded BCT-20K cassette tape to its beginning portion, and then insert it.</li> <li>• Put the unit into the REW-SEARCH mode. Three seconds later, connect TP50 on the SV-94P Board (F-2) to GND with a shorting clip. Then, put the unit into the REW-SEARCH STILL mode.</li> <li>• DC voltmeter</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	Positive (+) side : TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)  $66 \pm 2$ mVdc  <Reference> When REW-SEARCH mode: $66 \pm 5$ mVdc	• RV29/SV-94P (L-3)

## 9-5. ×1/30 TOP FF ADJUSTMENT (AT THE TAKE-UP REEL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the pre-recorded BCT-20K cassette tape to its beginning, and then insert it.</li> <li>Put the unit into the FF-SEARCH mode. Three seconds later, connect TP50 on the SV-94P Board (F-2) to GND with a shorting clip. Then, put the unit into the FF-SEARCH STILL mode.</li> <li>DC voltmeter</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	<p>Positive (+) side : TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)</p> <p style="text-align: center;"><math>264 \pm 2</math> mVdc</p> <p>&lt;Reference&gt;</p> <p>When FF-SEARCH mode:  <math>264 \pm 10</math> mVdc</p>	◎RV30/SV-94P (L-3)

## 9-6. ×1/30 TOP FF ADJUSTMENT (AT THE SUPPLY REEL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it.</li> <li>Put the unit into the FF-SEARCH mode. Three seconds later, connect TP50 on the SV-94P Board (F-2) to GND with a shorting clip. Then, put the unit into the FF-SEARCH STILL mode.</li> <li>DC voltmeter</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	<p>Positive (+) side : TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (F-1)</p> <p style="text-align: center;"><math>286 \pm 2</math> mVdc</p> <p>&lt;Reference&gt;</p> <p>When FF-SEARCH mode:  <math>110 \pm 5</math> mVdc</p>	◎RV33/SV-94P (L-2)

### 9-7. ×1/30 TOP REW ADJUSTMENT (AT THE SUPPLY REEL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it.</li> <li>Put the unit into the REW-SEARCH mode. Three seconds later, connect TP50 on the SV-94P Board (F-2) to GND with a shorting clip. Then, put the unit into the REW-SEARCH STILL mode.</li> <li>DC voltmeter</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	<p>Positive (+) side : TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (F-1)</p> <p style="text-align: center;"><math>198 \pm 2</math> mVdc</p> <p>&lt;Reference&gt;</p> <p>When REW-SEARCH mode:  <math>285 \pm 10</math> mVdc</p>	• RV34/SV-94P (L-2)

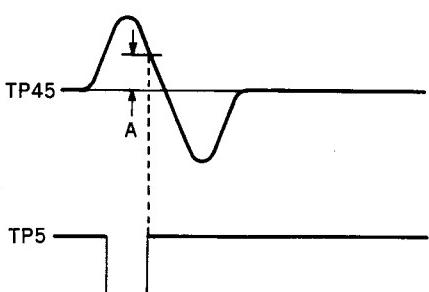
### 9-8. SEARCH ×3 CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it.</li> <li>REW-SEARCH mode</li> <li>DC voltmeter</li> </ul>	<p>Positive (+) side : TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (F-1)</p> <p style="text-align: center;"><math>440 \pm 2</math> mVdc</p> <p>&lt;Reference&gt;</p> <p>When inserting a pre-recorded BCT-20K cassette tape which is set to its end portion:  <math>285 \pm 10</math> mVdc</p>	• RV32/SV-94P (L-3)

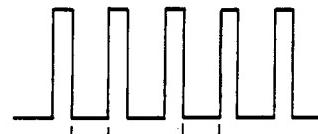
## 9-9. BACK TENSION ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it.</li> <li>FF-SEARCH mode</li> <li>DC voltmeter</li> </ul>	<p>Positive (+) side : TP11/SD-16P (E-1)      Negative (-) side: TP12/SD-16P (E-1)</p> <p style="text-align: center;"><math>1080 \pm 10 \text{ mVdc}</math></p> <p>&lt;Reference&gt;      When inserting a pre-recorded BCT-20K cassette tape which is set to its end portion:</p> <p style="text-align: center;"><math>1080 \pm 50 \text{ mVdc}</math></p>	• RV35/SV-94P (L-2)

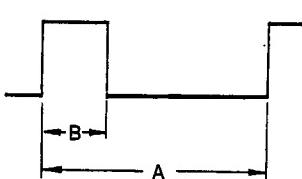
## 9-10. DRUM PG ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode.</li> <li>PLAY mode</li> </ul>	<p>CH-1: TP45/SV-94P (B-3)      CH-2: TP5/SV-94P (B-3)</p>  <p style="text-align: center;"><math>A = 25 \text{ mV} \pm 25 \text{ mV}</math></p> <p>&lt;Reference&gt;      When connecting TP16 on the SV-94P Board (F-3) to GND with a shorting clip:  <math>A = 25 \text{ mV} \pm 25 \text{ mV}</math></p>	• RV1/SV-94P (B-2)

## 9-11. CAPSTAN FG-B ADJUSTMENT

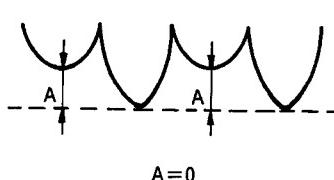
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode.</li> <li>PLAY mode</li> </ul>	<p>CH-1: TP22/SV-94P (G-2)      CH-2: (TRIG): TP401/SV-94P (G-2)</p>  <p style="text-align: center;"><math>A = B</math></p>	• RV15/SV-94P (G-2)

## 9-12. CAPSTAN FREE SPEED TENTATIVE ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Insert the alignment tape CR5-2A PS.</li> <li>PLAY mode</li> </ul>	<p>TP20/SV-94P (A-1)</p>  <p style="text-align: center;">Duty cycle <math>\left(\frac{B}{A}\right) = 30 \pm 2\%</math></p>	• RV21/SV-94P (B-1)

## 9-13. STOP SERVO ADJUSTMENT

### Step 1

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect TP24 on the SV-94P (J-1) Board to TP26 on the SV-94P (K-1) with a shorting clip.</li> <li>Play back color bar signal on the alignment tape CR5-2A PS.</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	<p>TP28/SV-94P (J-1)</p>  <p style="text-align: center;"><math>A=0</math></p>	• RV18/SV-94P (J-2)

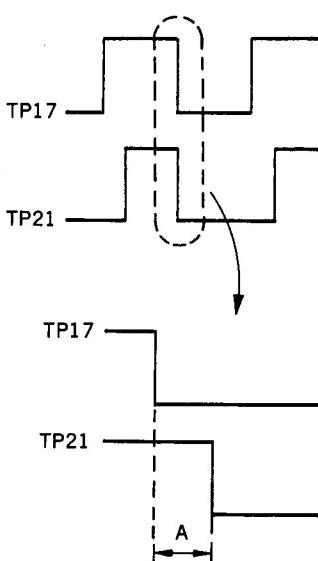
## Step 2

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back color bar signal on the alignment tape CR5-2A PS.</li> </ul>	TP29/SV-94P (H-2)  Check $B \geq \frac{A}{2}$	

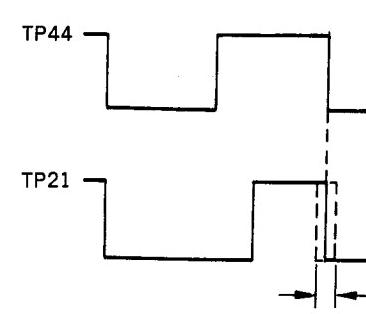
## Step 3

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect TP25 on the SV-94P (J-1) Board to TP27 on the SV-94P Board (K-2) with a shorting clip.</li> <li>Play back color bar signal on the alignment tape CR5-2A PS.</li> <li>PLAY+PAUSE mode</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	TP41/SV-94P (H-1) A = $0.6 \pm 0.05$ Vdc	<input checked="" type="radio"/> RV19/SV-94P (J-2)

## 9-14. TRACKING CENTER TENTATIVE ADJUSTMENT

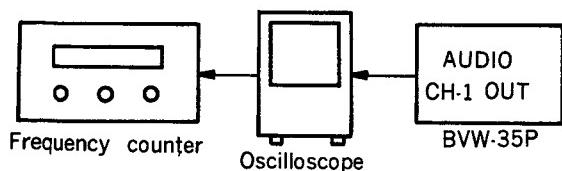
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the TRACKING control volume to the center clicked position.</li> <li>Insert the alignment tape CR2-1B PS.</li> <li>PLAY mode</li> </ul>	<p>CH-1: TP17/SV-94P (G-1)      CH-2: TP21/SV-94P (E-2)</p>  <p>A = <math>6.7 \pm 0.1</math> ms</p>	<p>• RV14/SV-94P (F-2)</p> <p>• Adjust center of the jitter.</p>

## 9-15. 1/2VD PB CTL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect TP16 on the SV-94P Board (F-3) to GND with a shorting clip.</li> <li>Insert the alignment tape CR2-1B PS.</li> <li>PLAY mode</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	<p>CH-1: TP44/SV-94P (J-1)      CH-2: TP21/SV-94P (E-2)</p>  <p>A = <math>0 \pm 100 \mu\text{sec}</math></p>	<p>• RV21/SV-94P (B-1)</p>

## 9-16. TAPE SPEED ADJUSTMENT

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Connect as follows with shorting clips: TP21/SY-110 (C-1) <math>\leftrightarrow</math> GND TP30/SV-94P (B-1) <math>\leftrightarrow</math> GND</li> <li>• Insert the alignment tape CR8-1A PS.</li> <li>• Play back from 0: 00 to 2: 55 on the alignment tape CR8-1A PS.</li> <li>• After the adjustment, remove the shorting clips.</li> </ul>	<p>AUDIO OUT CH-1 connector</p> <p>tape speed=<math>1000 \pm 1</math> Hz</p>	<p>• <input checked="" type="checkbox"/> RV20/SV-94P (B-2)</p> <p>• Adjust output level according to the correction value.</p>

## 9-17. FF/REW SPEED ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Insert the Alignment tape CR5-2A PS.</li> <li>• REW mode (from 15: 00 to 5: 00 on the alignment tape CR5-2A PS).</li> </ul>	<p>TP17/SV-94P (G-1)</p> <p><math>2.66 \text{ msec} \pm 0.05 \text{ msec}</math></p>	<p>• <input checked="" type="checkbox"/> RV23/SV-94P (K-2)</p>

## 9-18. DRUM LOCK PHASE/P<sup>2</sup> PHASE ADJUSTMENT

### Step 1

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Connect TP7/SV-94P (C-4) to GND with a shorting clip.</li> <li>• VIDEO IN: color bar signal</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	<p>CH-1: TP42/SV-94P (B-3) CH-2: TP48/SV-94P (A-1)</p> <p>A = <math>143 \pm 9.5 \mu\text{sec}</math> (<math>2.25 \pm 0.15</math>H)</p>	• RV7/SV-94P (E-2)

### Step 2

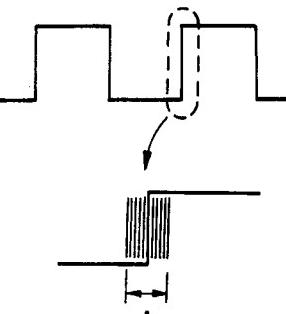
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO IN: color bar signal</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> </ul>	<p>CH-1: TP42/SV-94P (B-3) CH-2: TP48/SV-94P (A-1)</p> <p>A = value in step 1 <math>\pm 6.3 \mu\text{sec}</math> (0.1H)</p>	• RV4/SV-94P (B-3)

## 9-19. DRUM AFC ADJUSTMENT

### Step 1

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>TBC SW: OFF</li> <li>Connect VIDEO OUT 1 to the monitor.</li> <li>Play back color bar signal on the alignment tape CR5-2A PS.</li> </ul>	TP12/SV-94P (E-1) $2.5 \pm 0.5$ Vdc TP11/SV-94P (E-1) voltage value in $TP12 \pm 0.5$ Vdc	

### Step 2

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set RV37 on the SV-94P Board (E-2) to the mechanical center position.</li> <li>Play back color bar signal on the alignment tape CR5-2A PS.</li> <li>STILL mode</li> </ul>	TP10/SV-94P (D-1)  Time difference A between PLAY and STILL modes $\leq 0.1 \mu\text{sec}$ * The monitor should be locked.	<input checked="" type="checkbox"/> RV10/SV-94P (F-1) • Adjust center of the jitter.

### Step 3

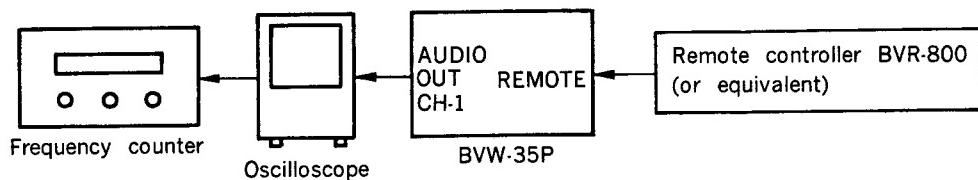
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back color bar signal on the alignment tape CR5-2A PS.</li> <li>REW-SEARCH mode</li> </ul>	CN11 (6 pin)/SV-94P (E-1) $1.85 \pm 0.02$ Vdc	<input checked="" type="checkbox"/> RV37/SV-94P (E-2)

**Step 4 Check**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back color bar signal on the alignment tape CR5-2A PS.</li> <li>PLAY mode and STILL mode</li> </ul>	TP13/SV-94P (E-1) Voltage difference between PLAY mode and STILL mode $\leq 0.3$ Vdc	

**9-20. SEARCH X1/30 ADJUSTMENT**

[Connection]



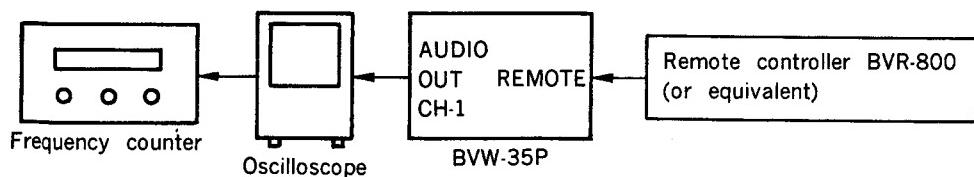
[Preparation]

- CH-1 AUDIO IN:  $3000 \pm 1$  Hz  $-60$  dBs
- Insert a BCT-20K cassette tape, and record above signal.  
\* Recording near the middle of the tape is also possible. (approximately five minutes)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Put the unit into the remote controller's FWD SEARCH <math>\times 1/30</math> mode near the middle of the tape.</li> <li>Set the (3 kHz) recorded BCT-20K cassette tape to near its middle portion.</li> <li>Remote controller BVR-800 (or the equivalent)</li> <li>Frequency counter</li> </ul>	AUDIO OUT CH-1 connector  100.0 $\pm 2$ Hz	<span style="color: blue;">●</span> RV16/SV-94P (F-2)

## 9-21. SEARCH X1 ADJUSTMENT

[Connection]



[Preparation]

- CH-1 AUDIO IN:  $3000 \pm 1$  kHz –60 dBs
- Insert a BCT-20K cassette tape, and then record above signal.  
\* Recording near the middle of the tape is also possible (approximately five minutes).

Machine conditions for adjustment	Specifications	Adjustments
• Put the unit into the remote controller's FWD-SEARCH ×1 mode near the middle of the tape.	AUDIO OUT CH-1 connector  2950 ± 10 Hz	● RV17/SV-94P (F-2)
• Set the (3 kHz) recorded BCT-20K cassette tape to its middle.	⟨Reference⟩  When FWD-SEARCH ×1/30 mode. 100 ± 5 Hz	
• Remote controller (BVR-800 or the equivalent)	When FWD-SEARCH ×5 mode.  8700 ± 500 Hz	
• Frequency counter		

## 9-22. QUICK START ADJUSTMENT

### Step 1

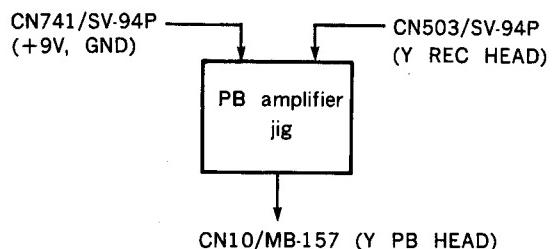
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>Connect as follows with shorting clips. TP22/SY-110 (C-1) <math>\leftrightarrow</math> GND TP16/SV-94P (F-3) <math>\leftrightarrow</math> GND TP46/SV-94P (A-3) <math>\leftrightarrow</math> GND</li> <li>Play back color bar signal on the alignment tape CR5-2A PS.</li> <li>After the adjustment, remove the shorting clips.</li> </ul>	<p>CH-1: TP44/SV-94P (J-1) CH-2: TP21/SV-94P (E-2)</p> <p>A = <math>1.25 \pm 0.25</math> msec</p>	<p>• RV22/SV-94P (B-1)</p> <p>• Adjust the center of the jitter.</p>

### Step 2 Check

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>REC mode</li> <li>Press the PAUSE button five times each two seconds.</li> <li>Play back the recorded portion.</li> </ul>	<p>CH-1: TP44/SV-94P (J-1) CH-2: TP21/SV-94P (E-2)</p> <p>A <math>\leq 0.5</math> msec B <math>\leq 1.0</math> msec</p> <p>*When specification is not satisfied, perform readjustment within the spec. in the step1.</p>	

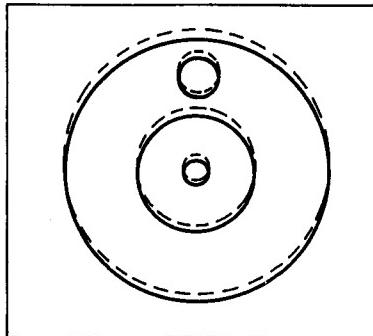
## 9-23. RECORDING PICTURE SPLIT ADJUSTMENT

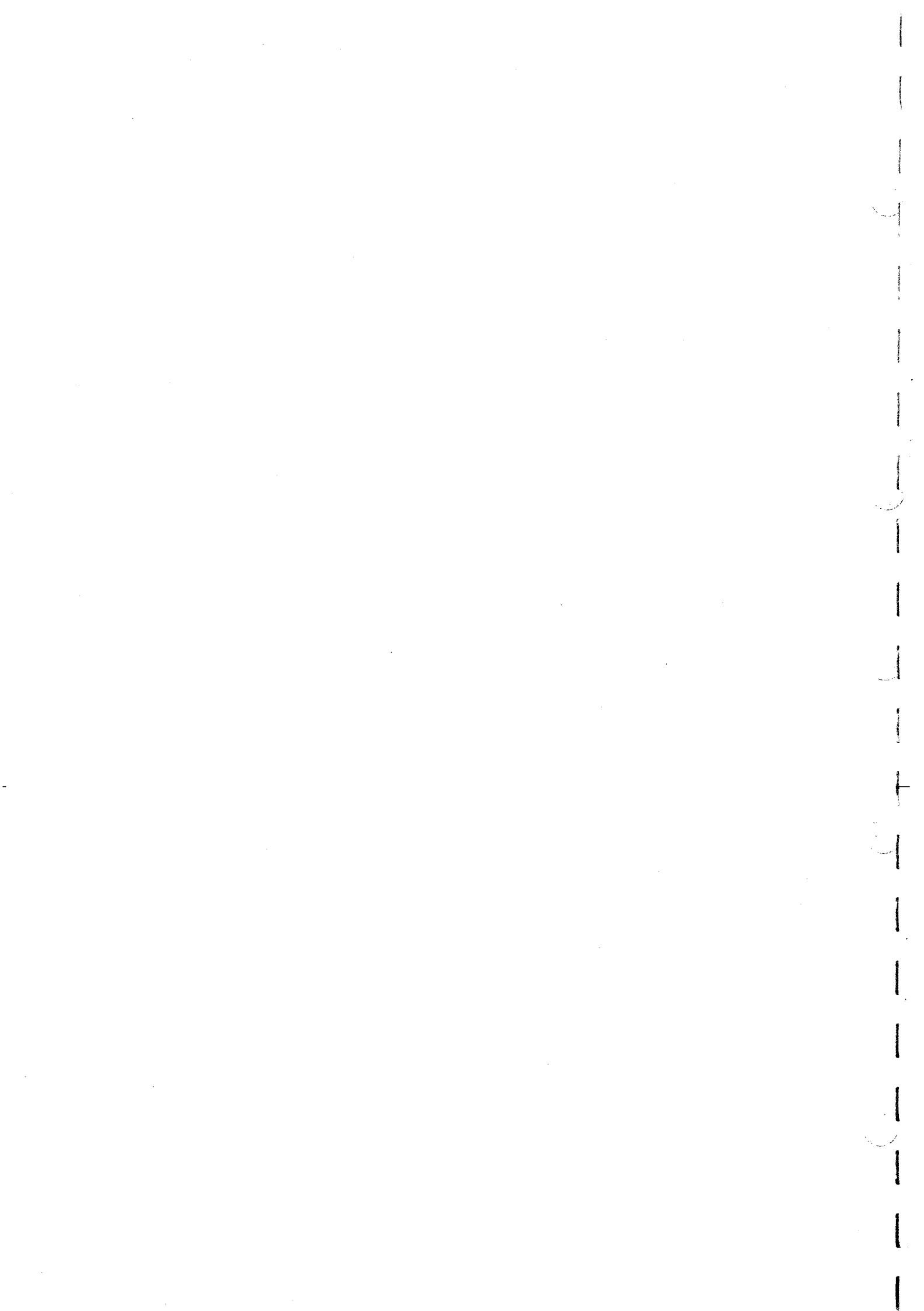
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect a monitor to the VIDEO OUT connector.</li> <li>Connect the PB amplifier jig.</li> <li>Connect TP16 on the SV-94P Board (F-3) to GND with a shorting clip.</li> <li>S1/ENC-11P (C-1): ON</li> <li>Play back C-monoscope signal on the alignment tape CR5-2A PS.</li> <li>Put the monitor into the H-DELAY mode.</li> <li>After the adjustment, set S1 on the ENC-11P Board to OFF again, and then remove the shorting clip.</li> </ul>	<p>monitor</p> <p style="text-align: center;">picture splitting point</p> <p style="text-align: center;">picture split <math>A \leq 1\mu\text{sec}</math></p>	
	<p>If the specification is not satisfied, perform adjustment as follows:</p> <p>Step 1 Check the picture splitting point.  Step 2 Set RV12 to the mechanical center position.  Step 3 Adjust the picture splitting point to the former position with RV11.  Step 4 Minimize the picture split A with RV12.</p>	<input checked="" type="checkbox"/> RV11/SV-94P (E-2) <input checked="" type="checkbox"/> RV12/SV-94P (D-1)

#### 9-24. V JITTER ADJUSTMENT IN THE STILL MODE

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Connect a monitor to the VIDEO OUT connector.</li> <li>• Play back C-monoscope signal on the alignment tape CR5-2A PS.</li> <li>• PLAY・PAUSE mode</li> </ul>	<p>monitor</p>  <p>Minimize the V jitter</p>	• RV36/SV-94P (C-3)



## SECTION 10

### AUDIO SYSTEM ALIGNMENT

**[Required equipment]**

- Audio oscillator
- Audio attenuator
- AC voltmeter/Audio noise meter
- Spectrum analyzer
- Dual-trace oscilloscope
- Alignment Tape CR8-1A PS (96-0098-45)

**Contents**

TIME min. sec	AUDIO TRACK
0: 00	1kHz, OVU
2: 55	Blank
3: 00	10kHz, -10VU
4: 55	Blank
5: 00	1kHz, -20VU
5: 55	Blank
6: 00	40Hz 7kHz 10kHz 15kHz
7: 55	Blank
8: 00	1kHz, OVU AUDIO CH-1, CH-2 CTL
10: 00	

- Alignment tape CR5-1B PS (8-960-096-91)

**Contents**

TIME min. sec	VIDEO TRACK	AFM
0: 00	RF Sweep	
2: 00	60% H Sweep (CTDM)	
5: 00	Pulse & Bar (CTDM)	No-Signal
8: 00	Multi Sweep	
11: 00	Pulse & Bar	
14: 00	100% Color Bars	400 Hz SINE WAVE 25 kHz DEVIATION
16: 30		75 kHz DEVIATION
17: 00	Bowtie & 10T	
19: 00	Line 17A Signal	
22: 00	Quad Phase	
24: 00	Flat Field	
26: 00	100% Color Bar with Dropout	
28: 00	Composite H Sweep with VISC	
30: 00		

- Alignment Tape CR8-1B PS (8-960-096-86)

## Contents

TIME min. sec	AUDIO TRACK	VIDEO TRACK	CTL TRACK
00: 00	1 kHz OVU	Black Burst	CTL
02: 30	Blank (only Bias)	Black Burst	CTL
03: 00	15 kHz OVU	Black Burst	CTL
05: 00	1 kHz -20VU	Black Burst	CTL
06: 00	40 Hz -20VU 7 kHz -20VU 10 kHz -20VU 15 kHz -20VU	Black Burst	CTL
08: 00	1 kHz OVU	—	1 kHz Sine Wave
10: 00			

### [NOTE]

When replacing the VRs described below, be sure to turn the VRs fully counterclockwise direction from viewing the component side.

- RV1 on the HP-36 Board
- RV1 on the VR-63 Board

### [Switch Setting]

#### • Front panel

- |                             |          |
|-----------------------------|----------|
| CH-1 AUDIO REC level switch | : MANUAL |
| CH-2 AUDIO REC level switch | : MANUAL |
| METER select switch         | : AUDIO  |

#### • Connector Panel

- |                              |                       |
|------------------------------|-----------------------|
| CAMERA/LINE select switch    | : LINE (CH-1 to CH-4) |
| AUDIO IN level select switch | : +4dB (CH-1 to CH-4) |
| AFM INPUT switch             | : CH-3/CH-4           |
| EE select switch             | : NORMAL              |
| CH-4 OUT switch              | : CH-4                |
| CH-1 +48V switch             | : OFF                 |
| AUDIO NR switch              | : OFF                 |
| MONITOR select switch        | : OFF (CH-1 to CH-4)  |
| CONF1 switch                 | : Y AUDIO             |
| VIDEO IN select switch       | : LINE                |
| TBC switch                   | : OFF                 |
| DUB switch                   | : CH-2                |

These switches and volume controls should not be touched unless otherwise specified.

### [Blank Tape]

The "Blank Tape" described in the adjustment item indicates the cassette tape on which no video and audio signals are recorded.

When performing the audio system alignment, extend the AU-93P Board with an extension board (EX-150 Board).

When performing Longitudinal Audio system alignment, set S1 on the AU-93P Board (E-3) to the LV102 side. After alignment, set S1 to the former position. Check that the S2 on the AU-93P Board (C-1) is set to the CH-1 side.

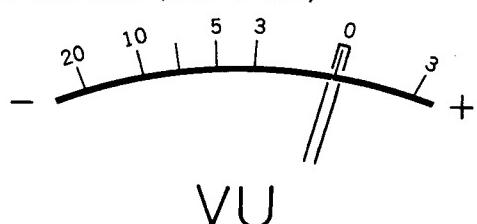
## 10-1. EE LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"><li>• EE mode</li><li>• AUDIO IN CH-1/CH-2 : 1 kHz, +4 dBs</li><li>AUDIO IN CH-3/CH-4 : 400Hz, +4 dBs</li></ul>	<p>CH-1: TP102/AU-93P (F-4) CH-2: TP202/AU-93P (F-4)</p> <p style="text-align: center;"><math>-10 \pm 0.1</math> dBs</p> <p>CH-3: pin 1 of the NR-19 Board/AU-93P (C-2) CH-4: pin 10 of the NR-19 Board/AU-93P (C-2)</p> <p style="text-align: center;"><math>-19.5 \pm 0.1</math> dBs</p> <p>Note: Be careful not to touch the REC VRs which have been adjusted.</p>	<p>● CH-1/CH-2: CH-1, CH-2 REC VRs on the front panel</p> <p>● CH-3/CH-4: CH-3, CH-4 REC VRs on the front panel</p>

## 10-2. LIMITER OPERATION LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"><li>• Set the CH-1/CH-2 AUDIO IN level select switch to <math>-60</math> dB.</li><li>• EE mode</li><li>• AUDIO IN CH-1/CH-2 : 1kHz, <math>-30</math> dBs</li><li>• After the adjustment, set the CH-1/CH-2 AUDIO IN level select switch to <math>+4</math> dB.</li></ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)</p> <p style="text-align: center;"><math>+15 \pm 0.2</math> dBm</p>	<p>● CH-1: RV101/AU-93P (D-3) ● CH-2: RV201/AU-93P (C-3)</p>

### 10-3. LEVEL METER CALIBRATION ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>EE mode</li> <li>AUDIO IN (CH-1 to CH-4): 1 kHz, +4 dBs</li> <li>METER select switch: AUDIO</li> <li>Put the unit upright and place the meter at horizontal level.</li> </ul>	<p>Audio level meter (CH-1 to CH-4)</p>  <p>The pointer reading should be zero.</p> <p>&lt;Reference&gt;</p> <p>When putting the unit upright and placing the meter at the vertical level.</p>	<ul style="list-style-type: none"> <li>CH-1: RV5/MT-34 (A-1)</li> <li>CH-2: RV6/MT-34 (C-1)</li> <li>CH-3: RV7/MT-34 (D-1)</li> <li>CH-4: RV8/MT-34 (E-1)</li> </ul>

### 10-4. PB FREQUENCY RESPONSE ADJUSTMENT

#### Step 1. PB Frequency Response Check

Machine conditions for adjustment	Specifications	Adjustments																	
<ul style="list-style-type: none"> <li>Play back 1 kHz, 7 kHz, 10 kHz and 15 kHz signals on the alignment tape CR8-1A PS.</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency</th> <th colspan="2">Level</th> </tr> <tr> <th>CH-1</th> <th>CH-2</th> </tr> </thead> <tbody> <tr> <td>1 kHz</td> <td>Reference</td> <td>Reference</td> </tr> <tr> <td>7 kHz</td> <td>Reference <math>\pm 0.3</math> dB</td> <td>Reference <math>\pm 0.3</math> dB</td> </tr> <tr> <td>10 kHz</td> <td>Reference <math>\pm 0.5</math> dB</td> <td>Reference <math>\pm 0.5</math> dB</td> </tr> <tr> <td>15 kHz</td> <td>Reference <math>\pm 0.7</math> dB</td> <td>Reference <math>\pm 0.2</math> dB</td> </tr> </tbody> </table> <p>Note: Each audio level should be corrected according to the correction value.</p> <p>If the specification is not satisfied, proceed to the Step 2.</p>	Frequency	Level		CH-1	CH-2	1 kHz	Reference	Reference	7 kHz	Reference $\pm 0.3$ dB	Reference $\pm 0.3$ dB	10 kHz	Reference $\pm 0.5$ dB	Reference $\pm 0.5$ dB	15 kHz	Reference $\pm 0.7$ dB	Reference $\pm 0.2$ dB	<ul style="list-style-type: none"> <li>7 kHz Adjustment</li> <li>CH-1: RV302/AU-93P (D-2)</li> <li>CH-2: RV352/AU-93P (D-2)</li> <li>10 kHz and 15 kHz Adjustment</li> <li>CH-1: RV304/AU-93P (D-1)</li> <li>CH-2: RV354/AU-93P (D-1)</li> </ul>
Frequency	Level																		
	CH-1	CH-2																	
1 kHz	Reference	Reference																	
7 kHz	Reference $\pm 0.3$ dB	Reference $\pm 0.3$ dB																	
10 kHz	Reference $\pm 0.5$ dB	Reference $\pm 0.5$ dB																	
15 kHz	Reference $\pm 0.7$ dB	Reference $\pm 0.2$ dB																	

**Step 2. In case the high-frequency level is lower than the specified value.**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back 1 kHz, 7 kHz, 10 kHz and 15 kHz signals on the alignment tape CR8-1A PS.</li> </ul>	<ol style="list-style-type: none"> <li>Solder-bridge slots SL301 and SL351 and perform Step 1.</li> <li>When the specification is not satisfied: Solder-bridge slots SL302 and SL352 and perform Step 1.</li> <li>When the specification is not satisfied: Solder-bridge slots SL303 and SL353 and perform Step 1.</li> </ol>	

#### 10-5. PB LEVEL ADJUSTMENT

**Step 1.**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back 1 kHz, 0 VU signals on the alignment tape CR8-1B PS</li> </ul>	CH-1: TP102/AU-93P (F-4) CH-2: TP202/AU-93P (F-4) $-10 \pm 0.2$ dBs	<input checked="" type="checkbox"/> CH-1: RV303/AU-93P (D-3) <input checked="" type="checkbox"/> CH-2: RV353/AU-93P (C-3)

**Step 2.**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back 1 kHz, 0 VU signals on the alignment tape CR8-1B PS.</li> </ul>	AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load) $+4 \pm 0.3$ dBm  Note: Be careful not to touch the PB VRs which have been adjusted.	<input checked="" type="checkbox"/> CH-1: CH-1 PB VR <input checked="" type="checkbox"/> CH-2: CH-2 PB VR (on the front panel)

#### 10-6. FULL ERASE CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> </ul>	TP851/AU-93P (G-1)  $308 \pm 5$ mVrms	<input checked="" type="checkbox"/> RV851/AU-93P (H-2)

## 10-7. DUB ERASE CURRENT ADJUSTMENT

\*After the DUB Erase Current Adjustment, the CH-1 and CH-2 DUB phases should coincide with the signal phase at TP852.

If not, finely adjust them with LV901 and LV951. (Be sure to change the phase in the channel with higher level).

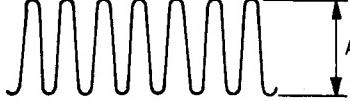
### 10-7-1. CH-1 DUB Erase Current Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1/CH-2 : No signal	Step1. TP852/AU-93P (F-1) $130 \pm 1$ kHz	• RV801/AU-93P (G-4)
• Insert a recorded BCT-20M cassette tape on which signals have been recorded.	Step2. TP902/AU-93P (F-1) (TRIG): TP852/AU-93P (H-4)	• LV901/AU-93P (G-1) • CP902/AU-93P (G-2)
• CH-1 DUB mode	Maximize the level.  * Adjustment should be performed within the range where the signal phase is locked.	
	Step3. TP902/AU-93P (F-1)  $440 \pm 0$ mVrms	• RV903/AU-93P (F-2)

### 10-7-2. CH-2 DUB Erase Current Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1/CH-2 : No signal	Step1. TP952/AU-93P (G-1) (TRIG): TP852/AU-93P (H-4)	• LV951/AU-93P (G-1) • CP952/AU-93P (G-2)
• Insert a recorded BCT-20M cassette tape on which signals have been recorded.	Maximize the level.  * Adjustment should be performed within the range where the signal phase is locked.	
• CH-2 DUB mode	Step2. TP952/AU-93P (G-1)  $440 \pm 0$ mVrms	• RV953/AU-93P (G-2)

## 10-8. BIAS CURRENT PRELIMINARY ADJUSTMENT

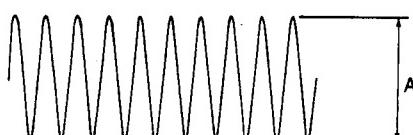
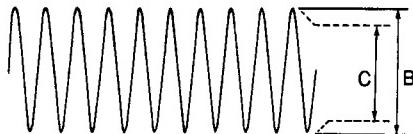
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• AUDIO IN (CH-1 to CH-4): No signals</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• REC mode</li> </ul>	<p>CH-1 : TP303/AU-93P (D-1) (GND) : TP304/AU-93P (D-1)</p> <p>CH-2 : TP353/AU-93P (D-1) (GND) : TP354/AU-93P (C-1)</p> <p>(TRIG) : TP852/AU-93P (H-4)</p> <p>* Check that signal waveform at TP is locked to TRIG, and proceed to the next adjustment.</p>	
	<p>Step1.</p>  <p>A = MAX</p>	<ul style="list-style-type: none"> <li>● CH-1: CP901/AU-93P (G-3)</li> <li>● CH-2: CP951/AU-93P (G-3)</li> </ul>
	<p>Step2.</p> <p>A = <math>15 \pm 2</math> mVrms</p>	<ul style="list-style-type: none"> <li>● CH-1: RV901/AU-93P (G-3)</li> <li>● CH-2: RV951/AU-93P (H-3)</li> </ul>

## 10-9. REC BIAS TRAP ADJUSTMENT

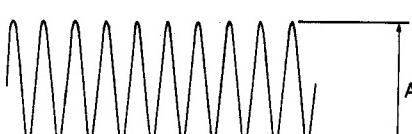
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Insert a BCT-20M cassette tape.</li> <li>• REC mode</li> <li>• AUDIO IN CH-1/CH-2 : No signals</li> </ul>	<p>CH-1 : TP302/AU-93P (E-2) CH-2 : TP352/AU-93P (F-1) (TRIG) : TP852/AU-93P (H-4)</p> <p>Minimize the bias leak. (<math>\leq 10</math> dBs)</p> <p>* Check that the leak bias is locked to TRIG.</p>	<ul style="list-style-type: none"> <li>● CH-1: LV301/AU-93P (E-2)</li> <li>● CH-2: LV351/AU-93P (E-1)</li> </ul>

## 10-10. BIAS CURRENT ADJUSTMENT (METAL)

### Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• CH-1 AUDIO IN: 1kHz, +4dBs</li> <li>• CH-4 OUT SW: MON</li> <li>CH-1 MONITOR SELECT SW: ON</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• REC mode</li> <li>• Turn RV901 on the AU-93P Board(G-3) fully counter clockwise direction temporarily.</li> </ul>	<p>AUDIO OUT CH-4 connector (at 600-ohm load)</p>  <p><math>A = (\text{maximum level}) - 2\text{dB}</math></p> <p>CH-1: TP303/AU-93P(D-1) (GND): TP304/AU-93P(D-1)</p> 	<p>① RV901/AU-93P(G-3) Turn RV901 gradually clockwise direction.</p>
<ul style="list-style-type: none"> <li>• After the adjustment CH-4 OUT SW: CH-4</li> <li>CH-1 MONITOR SELECT SW: OFF</li> </ul>	<p>① <math>B \geq 18 \text{ mVrms}</math>  <math>C = 15 \pm 0.2 \text{ mVrms}</math></p> <p>② <math>B \leq 18 \text{ mVrms}</math>  <math>C = B - 3 \pm 0.2 \text{ mVrms}</math></p> <p>*The signal waveform at TP should be locked to the TRIG. TRIG: TP852/AU-93P(H-4)</p>	<p>② RV901/AU-93P(G-3)</p>

## Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>CH-2 AUDIO IN: 1kHz, +4dBs</li> <li>CH-4 OUT SW: MON</li> <li>CH-2 MONITOR SELECT SW: ON</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> <li>Turn RV951 on the AU-93P Board (H-3) fully counter-clockwise direction temporarily.</li> <li>After the adjustment, CH-4 OUT SW: CH-4 CH-2 MONITOR SELECT SW: OFF</li> </ul>	<p>AUDIO OUT CH-4 connector (at 600-ohm load)</p>  <p><math>A \geq (\text{maximum level}) - 2\text{dB}</math></p> <p>CH-1: TP353/AU-93P(D-1) (GND): TP354/AU-93P(C-1)</p>  <p>① <math>B \geq 18 \text{ mVrms}</math> <math>C = 15 \pm 0.2 \text{ mVrms}</math></p> <p>② <math>B \leq 18 \text{ mVrms}</math> <math>C = B - 3 \pm 0.2 \text{ mVrms}</math></p> <p>* The signal waveform at TP should be locked to the TRIG. TRIG: TP852/AU-93P(H-4)</p>	<p>RV951/AU-93P(H-3)</p>
		<p>RV951/AU-93P(H-3)</p>

## 10-11. BIAS CURRENT ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2: No signals</li> <li>Insert a BCT-20K cassette tape.</li> <li>REC mode</li> </ul>	<p>CH-1 : TP303/AU-93P (D-1) (GND) : TP304/AU-93P (D-1)</p> <p>CH-2 : TP353/AU-93P (D-1) (GND) : TP354/AU-93P (C-1)</p> <p>(TRIG) : TP852/AU-93P (H-4)</p> <p><math>11 \pm 0.2 \text{ mVrms}</math></p> <p>* When the adjustment value is less than 11 mVrms. Value <math>\pm 0.2 \text{ mVrms}</math></p> <p>Note: The signal phase should be locked.</p>	<p>CH-1: RV902/AU-93P (G-3)</p> <p>CH-2: RV952/AU-93P (G-3)</p>

## 10-12. DUB BIAS TRAP ADJUSTMENT

### Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN: No signals</li> <li>Insert a BCT-20M cassette tape on which signals have been recorded.</li> <li>CH-2 DUB mode</li> </ul>	<p>CH-1: TP305/AU-93P (D-3)</p> <p>Minimize the level.</p>	<input checked="" type="checkbox"/> CH-1: LV302/AU-93P (D-2)

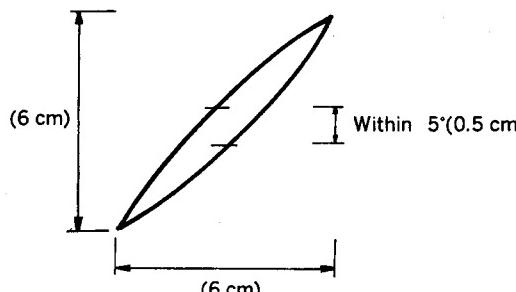
### Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN: No signals</li> <li>Insert a BCT-20M cassette tape on which signals have been recorded.</li> <li>CH-1 DUB mode</li> </ul>	<p>CH-2: TP355/AU-93P (C-3)</p> <p>Minimize the level.</p>	<input checked="" type="checkbox"/> CH-2: LV352/AU-93P (C-2)

## 10-13. OVERALL FREQUENCY RESPONSE ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments										
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2: 40, 1 k, 10 k, 15 k (Hz), -16dBs</li> <li>Insert a BCT-20K cassette tape.</li> <li>Play back the self-recorded tape.</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>40Hz</td> <td>Reference <math>\pm 3</math>dB</td> </tr> <tr> <td>1kHz</td> <td>Reference</td> </tr> <tr> <td>10kHz</td> <td>Reference <math>\pm 0.5</math>dB</td> </tr> <tr> <td>15kHz</td> <td>Reference <math>\pm 0.5</math>dB</td> </tr> </tbody> </table>	Frequency	Specification	40Hz	Reference $\pm 3$ dB	1kHz	Reference	10kHz	Reference $\pm 0.5$ dB	15kHz	Reference $\pm 0.5$ dB	<ul style="list-style-type: none"> <li>10 kHz and 15 kHz signal portion</li> <li><input checked="" type="checkbox"/> CH-1: RV1/AR-12P (F-2) [A2]</li> <li><input checked="" type="checkbox"/> CH-2: RV1/AR-12P (F-2) [A3]</li> <li>15 kHz signal portion only</li> <li><input checked="" type="checkbox"/> CH-1: LV101/AU-93P (E-3)</li> <li><input checked="" type="checkbox"/> CH-2: LV201/AU-93P (F-3)</li> </ul>
Frequency	Specification											
40Hz	Reference $\pm 3$ dB											
1kHz	Reference											
10kHz	Reference $\pm 0.5$ dB											
15kHz	Reference $\pm 0.5$ dB											

#### 10-14. OVERALL PHASE ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Oscilloscope connection (in X-Y mode)           <ul style="list-style-type: none"> <li>CH-1: CH-1 AUDIO OUT connector</li> <li>CH-2: CH-2 AUDIO OUT connector</li> </ul> </li> <li>AUDIO IN CH-1/CH-2: 15 kHz, +4 dBs</li> <li>Insert a BCT-20K cassette tape.</li> <li>Play back the self-recorded tape.</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load)            AUDIO OUT CH-2 connector (at 600-ohm load)</p> 	<ul style="list-style-type: none"> <li>RV2/AR-12P (F-2) [A2]            (F-2) [A3]</li> <li>* Either A2 or A3.</li> </ul>

#### 10-15. OVERALL LEVEL ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2: 1 kHz, +4dBs</li> <li>Insert a BCT-20K cassette tape.</li> <li>Play back the self-recorded tape.</li> </ul>	<p>CH-1: TP102/AU-93P (F-4)            CH-2: TP202/AU-93P (F-4)</p> <p style="text-align: center;">-10±0.1 dBs</p>	<ul style="list-style-type: none"> <li>CH-1: RV102/AU-93P (F-2)</li> <li>CH-2: RV202/AU-93P (F-1)</li> </ul>

#### 10-16. CONFI OUTPUT LEVEL ADJUSTMENT

##### Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1: 1kHz, +4dBs</li> <li>Insert a BCT-20K cassette tape.</li> <li>REC mode</li> <li>CH-1 MONITOR select SW: ON</li> <li>CH-4 OUT SW: MON</li> </ul>	<p>AUDIO OUT CH-4 connector (at 600-ohm load)</p> <p style="text-align: center;">+3±1 dBm</p>	<ul style="list-style-type: none"> <li>RV1/CO-8</li> </ul>

**Step 2. CH-2 Adjustment**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• AUDIO IN CH-2: 1kHz, +4dBs</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> <li>• CH-1 MONITOR select SW : OFF</li> <li>• CH-2 MONITOR select SW : ON</li> <li>• CH-4 OUT SW : MON</li> <li>• After the adjustment, return the CH-2 MONITOR select switch to OFF.</li> </ul>	<p>AUDIO OUT CH-4 connector (at 600-ohm load)</p> <p style="text-align: center;"><math>+3 \pm 1</math> dBm</p>	● RV2/CO-8

**10-17. CONFI TC CANCEL ADJUSTMENT**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2 : No signals</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> <li>• CH-1, 2 MONITOR select SW : ON</li> <li>• CH-4 OUT SW : MON</li> <li>• After the adjustment, return the CH-1/CH-2 MONITOR select switch to OFF and the CH-4 OUT switch to CH-4.</li> </ul>	<p>AUDIO OUT CH-4 connector (at 600-ohm load)</p> <p style="text-align: center;">Minimize the level.</p>	● RV702/AU-93P (C-1)

## 10-18. INSERT CROSSTALK CANCEL ADJUSTMENT

### Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1: No signals</li> <li>AUDIO IN CH-2: 5 kHz, +4 dBs</li> <li>Insert a BCT-20K cassette tape on which only CTL signals have been recorded.</li> <li>CH-2 DUB mode</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load)</p> <p>Minimize the crosstalk (5 kHz) in CH-2.</p> <p>Note: The AUDIO OUT level difference between CH-1 and CH-2 should be 20dB or more.</p>	<input checked="" type="checkbox"/> RV1/DC-33 <input checked="" type="checkbox"/> RV2/DC-33 Alternately adjust.

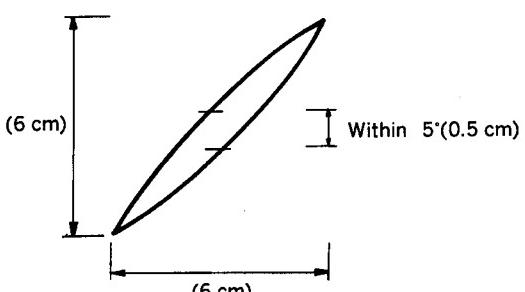
### Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1: 5 kHz, +4dBs</li> <li>AUDIO IN CH-2: No signals</li> <li>Insert a BCT-20K cassette tape on which only CTL signals have been recorded.</li> <li>CH-1 DUB mode</li> </ul>	<p>AUDIO OUT CH-2 connector (at 600-ohm load)</p> <p>Minimize the crosstalk (5 kHz) in CH-1.</p> <p>Note: The AUDIO OUT level difference between CH-1 and CH-2 should be 20 dB or more.</p>	<input checked="" type="checkbox"/> RV3/DC-33 <input checked="" type="checkbox"/> RV4/DC-33 Alternately adjust.

## 10-19. OVERALL FREQUENCY RESPONSE ADJUSTMENT (METAL)

Machine conditions for adjustment	Specifications	Adjustments										
<ul style="list-style-type: none"> <li>S1/AU-93P: OFF</li> <li>AUDIO IN CH-1/CH-2: 40, 1 k, 10 k, 15 k (Hz), -16 dBs</li> <li>Insert a BCT-20M cassette tape.</li> <li>Play back the self-recorded tape.</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load)</p> <p>AUDIO OUT CH-2 connector (at 600-ohm load)</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>40Hz</td> <td>Reference <math>\pm 3\text{dB}</math></td> </tr> <tr> <td>1kHz</td> <td>Reference</td> </tr> <tr> <td>10kHz</td> <td>Reference <math>\pm 0.5\text{dB}</math></td> </tr> <tr> <td>15kHz</td> <td>Reference <math>\pm 0.5\text{dB}</math></td> </tr> </tbody> </table>	Frequency	Specification	40Hz	Reference $\pm 3\text{dB}$	1kHz	Reference	10kHz	Reference $\pm 0.5\text{dB}$	15kHz	Reference $\pm 0.5\text{dB}$	<ul style="list-style-type: none"> <li>10 kHz and 15 kHz signal portion</li> <li>CH-1: RV3/AR-12P (F-2) [A2]</li> <li>CH-2: RV3/AR-12P (F-2) [A3]</li> <li>15 kHz signal portion only</li> <li>CH-1: LV102/AU-93P (E-3)</li> <li>CH-2: LV202/AU-93P (F-3)</li> </ul>
Frequency	Specification											
40Hz	Reference $\pm 3\text{dB}$											
1kHz	Reference											
10kHz	Reference $\pm 0.5\text{dB}$											
15kHz	Reference $\pm 0.5\text{dB}$											

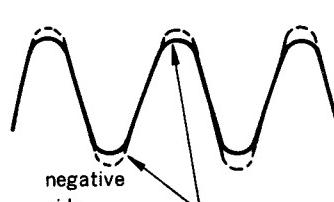
## 10-20. OVERALL PHASE ADJUSTMENT (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Oscilloscope connection (in X-Y mode)           <ul style="list-style-type: none"> <li>CH-1: AUDIO OUT CH-1 connector</li> <li>CH-2: AUDIO OUT CH-2 connector</li> </ul> </li> <li>• AUDIO IN CH-1/CH-2: 15 kHz, +4 dBs</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• Play back the self-recorded tape.</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load)            AUDIO OUT CH-2 connector (at 600-ohm load)</p> 	<p>● RV4/AR-12P [A2]            [A3]</p> <p>* Either A2 or A3.</p>

## 10-21. OVERALL LEVEL ADJUSTMENT (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2: 1kHz, +4 dBs</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• Play back the self-recorded tape.</li> </ul>	<p>CH-1: TP102/AU-93P (F-4)            CH-2: TP202/AU-93P (F-4)</p> <p>-10±0.3 dBs</p> <p>⟨Reference⟩            AUDIO OUT CH-1 connector (at 600-ohm load)            AUDIO OUT CH-2 connector (at 600-ohm load)</p> <p>+4±1 dBm</p>	<p>● CH-1: RV103/AU-93P (F-2)</p> <p>● CH-2: RV203/AU-93P (F-1)</p>

## 10-22. AFM LIMITER LEVEL ADJUSTMENT

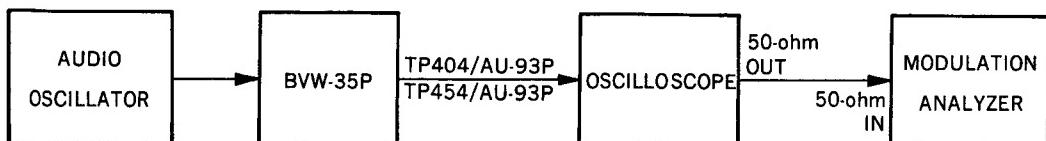
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-3/CH-4: 400Hz</li> <li>LEVEL SELECT SW: -20 dB</li> <li>Set pins 1 and 10 of the NR-19 Board to -19.5 dBs with the oscillator. Then, raise the level by 20 dB.</li> <li>EE mode</li> <li>Set the CH-3/CH-4 AUDIO IN level select SW to +4 dB again.</li> </ul>	<p>CH-3: TP405/AU-93P (B-2) CH-4: TP455/AU-93P (B-2)</p> <p style="text-align: center;">positive side</p>  <p>Adjust at point where the waveform distortion appears.</p> <p>* When the waveform distortion of the positive side appears at first, short SL502 on the AU-93P Board (B-3).</p>	<ul style="list-style-type: none"> <li>CH-3: RV405/AU-93P (B-2)</li> <li>CH-4: RV455/AU-93P (B-3)</li> </ul>

## 10-23. AFM CARRIER FREQUENCY ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-3/CH-4: No signal</li> <li>EE mode</li> </ul>	<p>Step1 TP404/AU-93P (A-3)</p> <p style="text-align: center;"><math>310 \pm 3 \text{ kHz}</math></p>	<ul style="list-style-type: none"> <li>CH-3: RV404/AU-93P (A-4)</li> </ul>
	<p>Step2 TP454/AU-93P (C-3)</p> <p style="text-align: center;"><math>540 \pm 3 \text{ kHz}</math></p>	<ul style="list-style-type: none"> <li>CH-4: RV454/AU-93P (C-4)</li> </ul>

## 10-24. AFM DEVIATION ADJUSTMENT

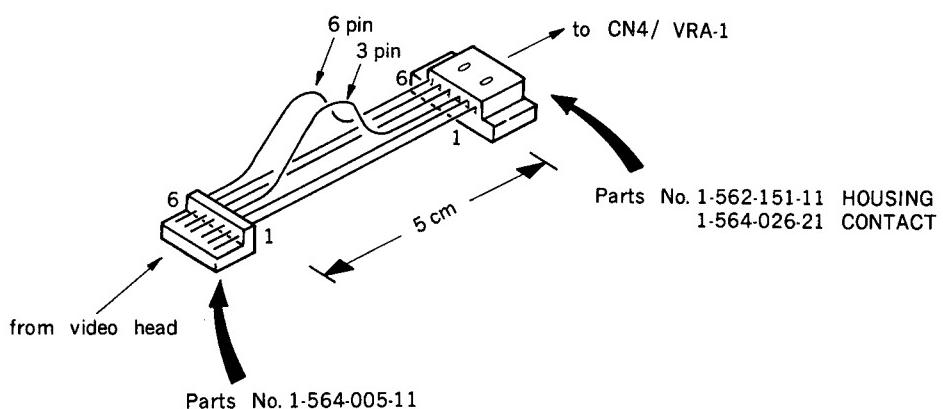
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: 400 Hz, +4 dBs	CH-3: TP404/AU-93P (A-3) CH-4: TP454/AU-93P (C-3)	• CH-3: RV403/AU-93P (A-3) • CH-4: RV453/AU-93P (B-3)
• Insert a BCT-20M cassette tape.	25±0.2 kHz	
• REC mode		

## 10-25. AFM RECORDING CURRENT ADJUSTMENT

- Prepare the extension harness for adjustment as follows;



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Connect pin 2 of CN2 on the VRA-1 Board and GND with a 300-ohm resistor.</li> <li>• Disconnect CN4 on the VRA-1 Board.</li> <li>• Connect the extension harness between CN4 and the harness.</li> <li>• Connect the Current probe to the pin 3 of the extension harness.</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• VIDEO IN: color bar signal</li> <li>• REC mode</li> <li>• AUDIO IN CH-3/CH-4: No signal</li> <li>• Spectrum analyzer</li> <li>• After the adjustment, Connect CN4 on the VRA-1 Board.</li> </ul>	<p>Step 1 Pin 3 of CN4/VRA-1</p> <p>A = <math>3.0 \pm 0.3</math> dB</p> <p>Step 2 Pin 3 of CN4/VRA-1</p> <p>A = <math>23.0 \pm 0.5</math> dB</p>	<p>• RV547/AU-93P (A-4)</p> <p>• RV548/AU-93P (A-4)</p>

#### 10-26. AFM PB RF LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• AUDIO IN CH-3/CH-4 : No signal</li> <li>• Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP502/AU-93P (A-3)</p> <p>A = <math>2.0 \pm 0.1</math> Vp-p</p>	<p>• RV550/AU-93P (A-2)</p>

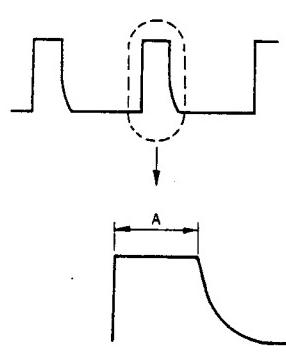
## 10-27. AFM PB LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• Play back the color bar signal on the alignment tape CR5-1B PS.	Step 1 CH-3: TP402/AU-93P (B-2) CH-4: TP452/AU-93P (B-2)  $-19.5 \pm 0.2 \text{ dBs}$ $-19.5 \pm 0.2 \text{ dBs}$	• CH-3: RV402/AU-93P (C-4) • CH-4: RV452/AU-93P (B-4)
	Step 2 AUDIO OUT CH-3 connector (terminated at 600 ohms). AUDIO OUT CH-4 connector (terminated at 600 ohms)  $4 \pm 0.5 \text{ dBm}$	• CH-3: Front panel: CH-3 PB VR • CH-4: Front panel: CH-4 PB VR

## 10-28. AFM D.O.C. LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: No signal  • Playback the color bar signal on the alignment tape CR5-1B PS.	Pin 10 of IC503/AU-93P (A-1)    $A = 500 \pm 10 \text{ mVp-p}$	• RV551/AU-93P (A-2)

## 10-29. AFM D.O.C. PULSE WIDTH ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-3/CH-4: No signal  • Play back the color bar signal on the alignment tape CR5-1B PS.	TP503/AU-93P (A-3)  	• RV549/AU-93P (B-2)

## SECTION 11

### VIDEO SYSTEM ALIGNMENT

#### [Equipment Required]

- Dual trace oscilloscope
- Frequency counter
- PAL signal generator (TEKTRONIX 1411 or equivalent)
- Component signal generator (TEKTRONIX TSG-300 or equivalent)
- Sweep generator
- Vectorscope
- Waveform monitor
- Component waveform monitor (TEKTRONIX WFM-300 or equivalent)
- Waveform vector monitor (TEKTRONIX 1751 or equivalent)
- VISC doubler
- Spectrum analyzer
- Digital voltmeter
- Shorting clip
- Blank tape (BCT-20K or equivalent)
- Blank tape (BCT-20M or equivalent)
- BETACAM (SONY BVW-75P or equivalent)
- Alignment tape CR5-2A PS (96-0098-44)

#### Contents

TIME min. sec	VIDEO TRACK
0: 00	75% Color Bars
3: 00	Multi Burst
6: 00	Bowtie & 10T
9: 55	Pulse & Bar
11: 00	Quad Phase
13: 00	C-Monoscope (Switching position is shifted.)
15: 00	

- Alignment tape CR5-1B PS (8-960-096-91)

#### Contents

TIME min. sec	VIDEO TRACK	AFM
0: 00	RF Sweep	
2: 00	60% H Sweep (CTDM)	
5: 00	Pulse & Bar (CTDM)	No-Signal
8: 00	Multi Sweep	
11: 00	Pulse & Bar	
14: 00	100% Color Bars	400 Hz SINE WAVE 25 kHz DEVIATION
16: 30		75 kHz DEVIATION
17: 00	Bowtie & 10T	
19: 00	Line 17A Signal	
22: 00	Quad Phase	
24: 00	Flat Field	No-Signal
26: 00	100% Color Bar with Dropout	
28: 00	Composite H Sweep with VISC	
30: 00		

#### [Switch Setting]

##### Connector Panel

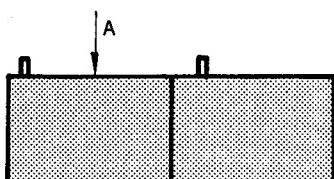
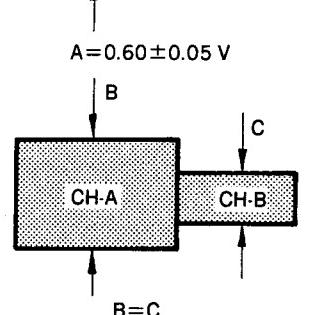
- EE SELECT SW; NORMAL
- VIDEO SW; LINE
- TBC SW; OFF
- DUB SW; CH-2
- CONFI SW; OFF
- TRACKING VR; center clicked position

These switches should not be touched unless otherwise specified.

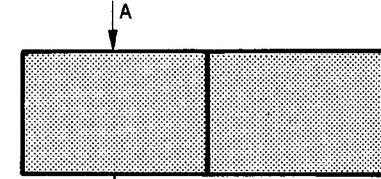
All of the Video boards (CEC-3P, DEC-49P, ENC-11P and MDM-3P) should be extended with an extension board (EX-150 Board).

## 11-1. MDM BOARD ALIGNMENT (PLAYBACK SYSTEM)

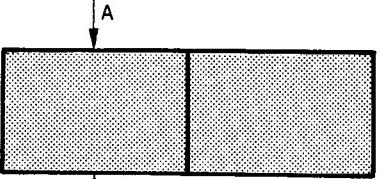
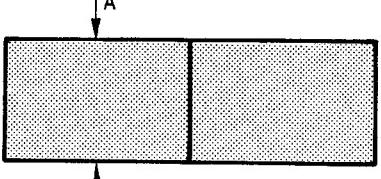
### 11-1-1. Y RF Balance/Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> <li>Maximize the RF signal level with the TRACKING control knob.</li> </ul>	<p>TP301/MDM-3P(F-4) Spec.1</p>  <p>Spec.2</p>  <p><math>A = 0.60 \pm 0.05 \text{ V}</math></p> <p><math>B = C</math></p> <p>TRIG: TP308/MDM-3P(F-3)</p>	<ul style="list-style-type: none"> <li>RV601/PA-60A[A301](F-4)</li> <li>RV602/PA-60A[A301](F-4)</li> </ul>

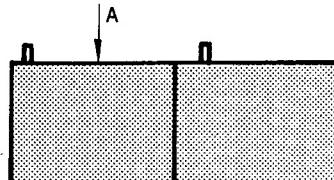
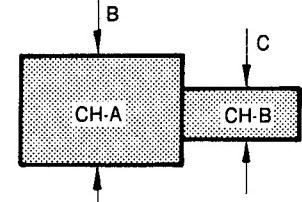
### 11-1-2. Y AGC Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set RV305 on the MDM-3P Board(G-4) to the mechanical center position.</li> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP302/MDM-3P(F-2)</p>  <p><math>A = 0.5 \pm 0.05 \text{ V}</math></p> <p>TRIG: TP308/MDM-3P(F-3)</p>	<ul style="list-style-type: none"> <li>RV603/RF-16A[A302](F-3)</li> </ul>

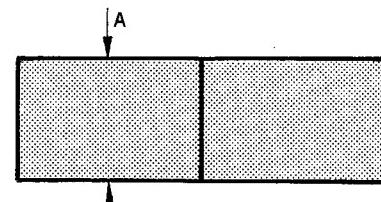
### 11-1-3. Y HF Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1  • Play back the flat field signal on the alignment tape CR5-1B PS.	TP303/MDM-3P(F-2)  $A = 0.10 \pm 0.01 \text{ V}$ TRIG: TP308/MDM-3P(F-3)	• RV607/EQ-14[A303](F-3)
Step. 2  • Play back the flat field signal on the alignment tape CR5-2A PS.	TP303/MDM-3P(F-2)  $A = 0.20 \pm 0.01 \text{ V}$ TRIG: TP308/MDM-3P(F-3)	• RV620/FL-66

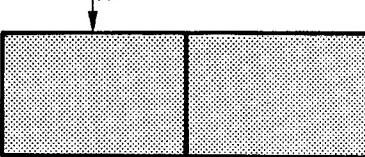
#### 11-1-4. C RF Balance Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> <li>Maximize the RF level with the TRACKING control knob.</li> </ul>	<p>TP401/MDM-3P(D-3) Spec.1</p>  <p><math>A = 0.50 \pm 0.05 \text{ V}</math></p> <p>Spec.2</p>  <p><math>B = C</math></p> <p>TRIG: TP408/MDM-3P(F-1)</p>	<p>• RV601/PA-60A[A401](E-4) • RV602/PA-60A[A401](E-4)</p>

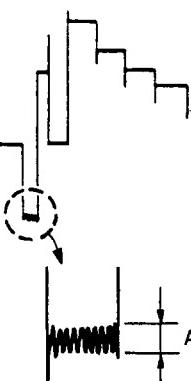
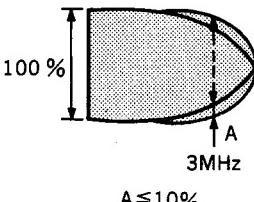
#### 11-1-5. C AGC Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP402/MDM-3P(D-3)</p>  <p><math>A = 0.6 \pm 0.05 \text{ V}</math></p> <p>TRIG: TP408/MDM-3P(F-1)</p>	<p>• RV603/RF-16A[A402](E-3)</p>

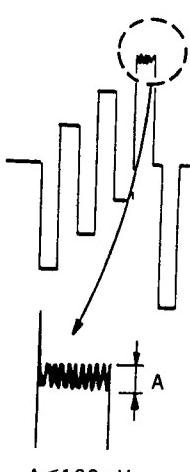
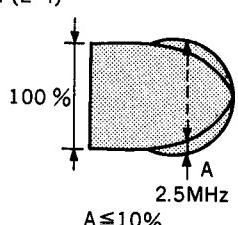
### 11-1-6. C HF Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> </ul>	TP403/MDM-3P(D-2)  $A = 0.2 \pm 0.01 \text{ V}$ TRIG: TP408/MDM-3P(F-1)	• RV607/EQ-14A[A403](E-3)

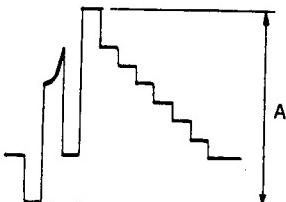
### 11-1-7. Y Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1 <ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-2A PS.</li> </ul>	TP306/MDM-3P(F-4)  $A \leq 100 \text{ mV}$	• RV302/MDM-3P(F-2) • RV608/DM-58[A304](G-1) • Alternately adjust.
Step. 2 (Check) <ul style="list-style-type: none"> <li>Play back the 60% H sweep (CTDM) signal on the alignment tape CR5-1B PS.</li> </ul>	TP306/MDM-3P(F-4)  $A \leq 10\%$	

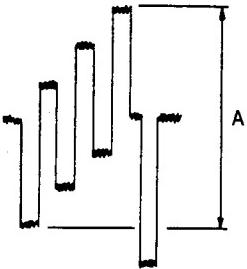
### 11-1-8. C Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1  <ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-2A PS.</li> </ul>	TP406/MDM-3P(E-4)   $A \leq 100\text{mV}$	<input checked="" type="checkbox"/> RV402/MDM-3P(D-2) <input checked="" type="checkbox"/> RV608/DM-58[A404](A-1) <ul style="list-style-type: none"> <li>Alternately adjust.</li> </ul>
Step. 2 (Check)  <ul style="list-style-type: none"> <li>Play back the 60% H sweep (CTDM) signal on the alignment tape CR5-1B PS.</li> </ul>	TP406/MDM-3P(E-4)   $A \leq 10\%$	

### 11-1-9. Y Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> <li>More than twenty seconds should elapse after the color bar signal is played back.</li> </ul>	TP306/MDM-3P(F-4)   $A = 1 \pm 0.01 \text{ V}$	<input checked="" type="checkbox"/> RV609/VA-54[A305](G-3)

### 11-1-10. C Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP406/MDM-3P(E-4)  $A = 0.93 \pm 0.01V$ (Measure in the center of noise)	● RV609/VA-54[A405](C-1)

### 11-1-11. Y D.O.C Sensitivity Adjustment

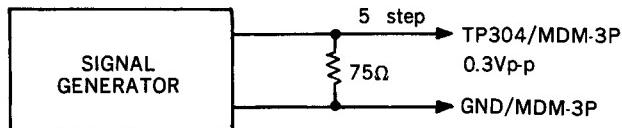
Machine conditions for adjustment	Specifications	Adjustments
Step. 1	<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> <li>Maximize the DC level with the TRACKING control knob.</li> </ul> <p>pin 2 of DO-19 [A307]/MDM-3P(E-3)</p> <p>V sync</p> <p>ENVELOPE dc level</p>	
Step. 2	<ul style="list-style-type: none"> <li>PB PAUSE mode</li> </ul> <p>CH-1: pin 2 of DO-19 [A307]/MDM-3P(E-3) CH-2: TP307/MDM-3P(F-4)</p> <p>pin 2 of DO-19</p> <p>TP307</p> <p>DO PULSE</p> <p>5 Vdc</p> <p>0 Vdc</p> <p>A=1.10 V (Metal) A=1.0 V (Oxide)</p>	<p>Metal: RV621/DO-19[A307](E-3)</p> <p>Oxide: RV620/DO-19[A307](E-3)</p>
Step. 3	<ul style="list-style-type: none"> <li>Check that no white noise appears near the guard band on a monitor.</li> </ul>	
Step. 4	<ul style="list-style-type: none"> <li>Play back the dropout check signal on the alignment tape CR5-1B PS.</li> </ul> <p>Check that the dropout portion is compensated on the monitor.</p>	

### 11-1-12. C D.O.C Sensitivity Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1	<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> <li>Maximize the DC level with the TRACKING control knob.</li> </ul> <p>pin 5 of DO-19 [A307]/MDM-3P(E-3)</p> <p>The diagram shows a rectangular pulse labeled 'V sync' followed by a long, low-level rectangular pulse labeled 'ENVELOPE dc level'.</p>	
Step. 2	<ul style="list-style-type: none"> <li>PB PAUSE mode</li> </ul> <p>CH-1: pin 5 of DO-19/MDM-3P(E-3) CH-2: TP407/MDM-3P(C-1)</p> <p>The diagram shows two waveforms: CH-1 (pin 5 of DO-19) which is a square wave envelope, and CH-2 (TP407) which is a sine wave. Below them is a waveform labeled 'DO PULSE' with levels '5 Vdc' and '0 Vdc'. A vertical dashed line labeled 'A' indicates a voltage of '0.85 V' between the zero-voltage baseline and the positive envelope level.</p>	• RV624/DO-19[A307](E-2)
Step. 3	<ul style="list-style-type: none"> <li>Check that no white noise appears near the guard band on a monitor.</li> </ul>	
Step. 4	<ul style="list-style-type: none"> <li>Play back the dropout check signal on the alignment tape CR5-1B PS.</li> </ul> <p>Check that the dropout portion is compensated on the monitor.</p>	

### 11-1-13. Y CCD Bias Adjustment

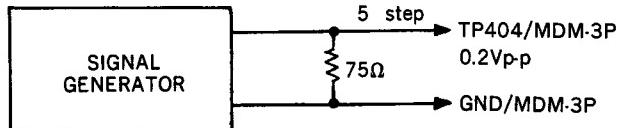
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Remove the solder bridge from SL1 on the MDM-3P Board(G-1).</li> <li>Supply 5-step signal to TP304 on the MDM-3P Board(G-1).</li> <li>Waveform monitor: DIFF'D STEP mode</li> <li>PLAY mode (without inserting a cassette tape)</li> <li>After the adjustment, solder SL1 to the former position.</li> </ul>	TP305/MDM-3P(G-4) <p>A waveform diagram showing a series of pulses. The amplitude of the first pulse is labeled 'A'. A vertical double-headed arrow indicates the full range of the waveform, labeled '100 %'.</p> <p><math>A \leq 5\%</math>  (Flat or the amplitude is decreased to the right)</p>	<span style="color: blue;">●</span> RV610/DL-13[A306](F-4)

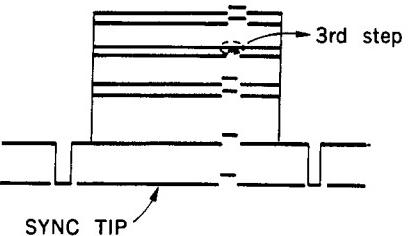
### 11-1-14. C CCD Bias Adjustment

[Connection]

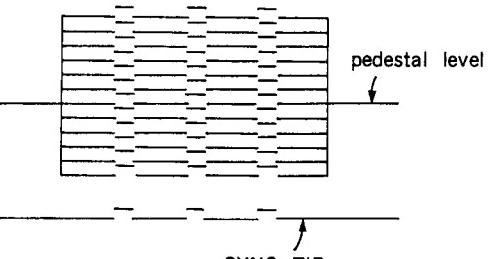


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Remove the SL2 on the MDM-3P Board(A-1).</li> <li>Supply 5-step signal to TP404 on the MDM-3P Board (A-1).</li> <li>Waveform monitor: DIFF'D STEP mode</li> <li>PLAY mode (without inserting a cassette tape)</li> <li>After the adjustment, solder the SL2 to the former position.</li> </ul>	TP405/MDM-3P(C-1) <p>A waveform diagram showing a series of pulses. The amplitude of the first pulse is labeled 'A'. A vertical double-headed arrow indicates the full range of the waveform, labeled '100 %'.</p> <p><math>A \leq 5\%</math>  (Flat or the amplitude is decreased to the right)</p>	<span style="color: blue;">●</span> RV610/DL-13[A406](D-2)

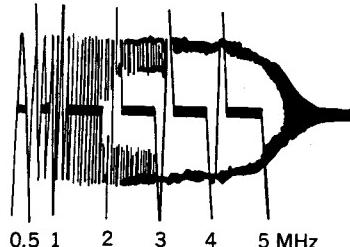
### 11-1-15. Y D.O.C Replacement Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back dropout check signal on the alignment tape CR5-1B PS.</li> </ul>	TP306/MDM-3P(F-4)  Spec. 1 Adjust the sync tip level. Spec. 2 Adjust the 3rd step at the dropout portion. TRIG: TP44/SV-94P(J-1)	Spec. 1 •RV303/MDM-3P(G-3) Spec. 2 •RV304/MDM-3P(C-4)

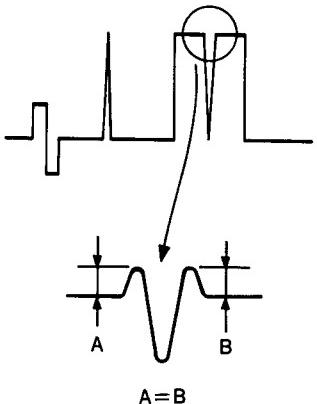
### 11-1-16. C D.O.C Replacement Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back dropout check signal on the alignment tape CR5-1B PS.</li> </ul>	TP406/MDM-3P(E-4)  Spec. 1 Adjust the sync tip level Spec. 2 Adjust the pedestal level TRIG: TP44/SV-94P(J-1)	Spec. 1 •RV403/MDM-3P(C-1) Spec. 2 •RV404/MDM-3P(D-1)

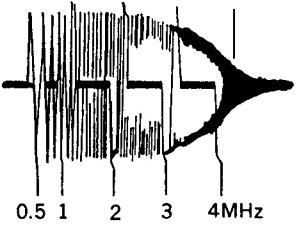
### 11-1-17. Y PB Frequency Response Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments														
• Play back the gated sweep (CTDM) signal on the alignment tape CR5-1B PS.	<p>TP306/MDM-3P(F-4) Spec. 1</p>  <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.5 MHz</td> <td>100% (reference)</td> </tr> <tr> <td>1 MHz</td> <td>100±5 %</td> </tr> <tr> <td>2 MHz</td> <td>100±5 %</td> </tr> <tr> <td>3 MHz</td> <td>100±5 %</td> </tr> <tr> <td>4 MHz</td> <td>100±5 %</td> </tr> <tr> <td>5 MHz</td> <td>100 %</td> </tr> </tbody> </table> <p>Read in the center of moire</p> <p>Spec. 2</p> <p>The difference between the CH-A and CH-B should be within 5 % at 5MHz.</p> <p>TRIG: TP308/MDM-3P(F-3)</p> <p>[NOTE]</p> <p>When the carrier balance is generated between the CH-A and CH-B, perform section 11-1-7: Y carrier balance adjustment.</p>	Frequency	Level	0.5 MHz	100% (reference)	1 MHz	100±5 %	2 MHz	100±5 %	3 MHz	100±5 %	4 MHz	100±5 %	5 MHz	100 %	<p>CH-A:  <input checked="" type="checkbox"/> RV605/EQ-14[A303](F-3)</p> <p>CH-B:  <input checked="" type="checkbox"/> RV606/EQ-14[A303](F-3)</p>
Frequency	Level															
0.5 MHz	100% (reference)															
1 MHz	100±5 %															
2 MHz	100±5 %															
3 MHz	100±5 %															
4 MHz	100±5 %															
5 MHz	100 %															

### 11-1-18. Y Equalizer Adjustment

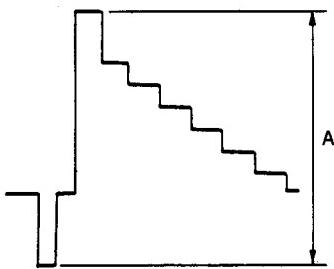
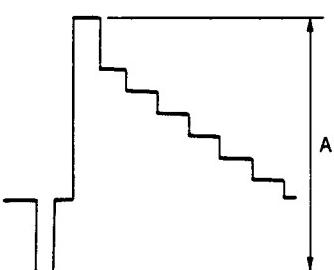
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the Pulse/bar (CTDM) signal on the alignment tape CR5-1B PS.</li> </ul>	TP306/MDM-3P(F-4) 	<span style="color: red;">●</span> RV619/FL-66

### 11-1-19. C PB Frequency Response Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments										
<ul style="list-style-type: none"> <li>Play back the gated sweep (CTDM) signal on the alignment tape CR5-1B PS.</li> </ul>	TP406/MDM-3P(E-4) Spec. 1  <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.5 MHz</td> <td>100% (reference)</td> </tr> <tr> <td>1 MHz</td> <td>100±5 %</td> </tr> <tr> <td>2 MHz</td> <td>100±5 %</td> </tr> <tr> <td>3 MHz</td> <td>90 %</td> </tr> </tbody> </table> <p>Read in the center of moire.</p> Spec. 2 The difference between the CH-A and CH-B should be within 5% at 3MHz. TRIG: TP408/MDM-3P(F-1)	Frequency	Level	0.5 MHz	100% (reference)	1 MHz	100±5 %	2 MHz	100±5 %	3 MHz	90 %	CH-A: <span style="color: red;">●</span> RV605/EQ-14A[A403](E-3) CH-B: <span style="color: red;">●</span> RV606/EQ-14A[A403](E-3)
Frequency	Level											
0.5 MHz	100% (reference)											
1 MHz	100±5 %											
2 MHz	100±5 %											
3 MHz	90 %											

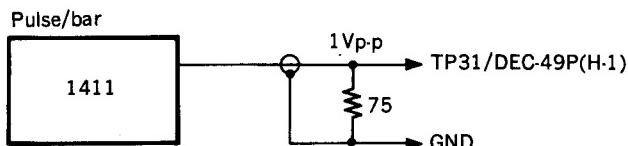
## 11-2. DEC BOARD ALIGNMENT

### 11-2-1. Y Noise Canceller Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1  <ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP31/DEC-49P(H-1)   $A = 1.0 \pm_{0.02} V$	• RV101/ENC-11P(H-1)
Step. 2  <ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	VIDEO OUT connector (terminated at 75 ohms)   $A = 1.0 \pm_{0.02} V_{p-p}$	• RV201/DEC-49P(H-1)

Step 3.

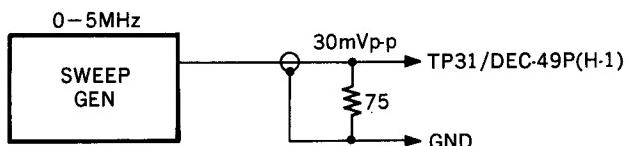
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Insert the alignment tape CR5-1B PS, and then put the unit into the PB mode.</li> <li>Disconnect CN2 on the DEC-49P Board.</li> </ul>	TP34/DEC-49P(H-3)  Make flat the center of the noise.	<input checked="" type="checkbox"/> RV203/DEC-49P(H-3)

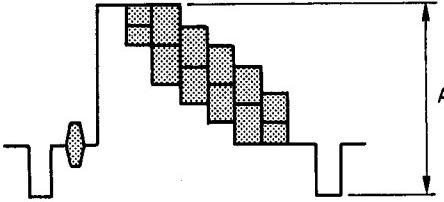
Step 4.

[Connection]

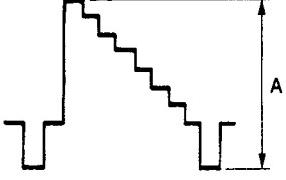
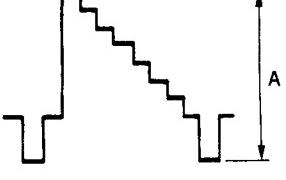


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Insert the alignment tape CR5-1B PS, and then put the unit into the PB mode.</li> <li>After the adjustment, connect CN2 on the DEC-49P Board.</li> </ul>	TP33/DEC-49P(G-2)  Adjust as the above illustration.	<input checked="" type="checkbox"/> RV202/DEC-49P(G-2)

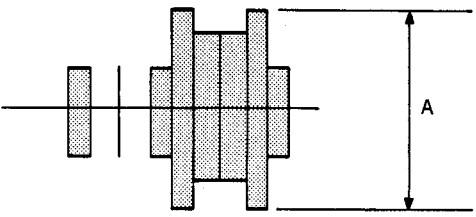
### 11-2-2. DEC Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the VIDEO LEVEL VR knob to the center clicked position.</li> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> </ul>	TP1/DEC-49P(E-4)  $A = 0.63 \pm 0.01 \text{ V}$	● RV2/BF-29

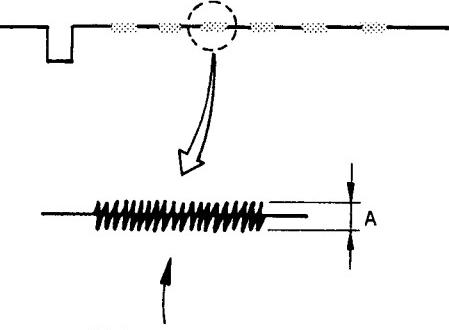
### 11-2-3. Y Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1 <ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (100/0/100/0)</li> <li>EE mode</li> </ul>	TP6/DEC-49P(C-4)  $A = 1.00 \pm 0.01 \text{ V}$	● RV505/DEC-49P(E-2)
Step. 2 <ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal (100% White)</li> <li>EE mode</li> </ul>	TP6/DEC-49P(C-4)  $A = 1.00 \pm 0.01 \text{ V}$	● RV508/DEC-49P(C-3)

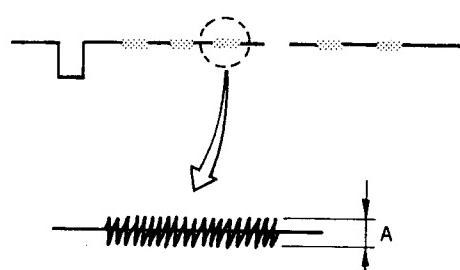
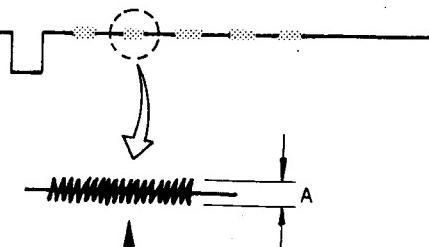
#### 11-2-4. Chroma Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (100-100-0)</li> <li>EE mode</li> </ul>	<p>TP3/DEC-49P(F-1) TP8/DEC-49P(F-1) TP9/DEC-49P(F-1)</p>  <p style="text-align: center;"><math>A = 1.00 \pm 0.01V</math></p>	<ul style="list-style-type: none"> <li>RV301/DEC-49P(F-1)</li> <li>RV303/DEC-49P(F-1)</li> <li>RV302/DEC-49P(F-1)</li> </ul>

#### 11-2-5. Y/C Mix Level Tentative Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (Y OFF)</li> <li>EE model</li> </ul>	<p>TP5/DEC-49P(G-3)</p>  <p style="text-align: center;">Minimize the chroma leak. <math>(A \leq 20mV_{p-p})</math></p> <p style="text-align: center;">TRIG: TP20/DEC-49P(C-4)</p>	<ul style="list-style-type: none"> <li>RV501/DEC-49P(G-4)</li> <li>RV502/DEC-49P(G-4)</li> </ul> <p>• Alternately adjust</p>

### 11-2-6. Carrier Leak Canceller Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (Y OFF)</li> <li>EE mode</li> </ul>	<p>Step. 1 TP5/DEC-49P(G-3)</p>  <p>A = <math>30 \pm 5</math> mVp-p</p> <p>TRIG: TP20/DEC-49P(C-4)</p>	<input checked="" type="checkbox"/> RV502/DEC-49P(G-4)
	<p>Step. 2 TP6/DEC-49P(C-4)</p>  <p>Minimize the chroma leak. (A ≤ 20 mVp-p)</p> <p>TRIG: TP20/DEC-49P(C-4)</p>	<input checked="" type="checkbox"/> RV401/DEC-49P(F-2) <input checked="" type="checkbox"/> RV503/DEC49P(F-3) <ul style="list-style-type: none"> <li>Alternately adjust.</li> </ul>

### 11-2-7. Y/C Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (Y OFF)</li> <li>EE mode</li> </ul>	<p>TP5/DEC-49P(G-3)</p> <p>Minimize the chroma leak. (<math>A \leq 20 \text{ mVp-p}</math>)</p> <p>TRIG: TP20/DEC-49P(C-4)</p>	<ul style="list-style-type: none"> <li>RV501/DEC-49P(G-4)</li> <li>RV502/DEC49P(G-4)</li> <li>Alternately adjust.</li> </ul>

### 11-2-8. Sampling Pulse Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> </ul>	<p>CH-1: TP6/DEC-49P(C-4) CH-2: TP21/DEC-49P(B-2)</p> <p><math>A = 6.0 \pm 0.1 \mu\text{sec}</math></p> <p>TRIG: TP1/DEC-49P(E-4)</p>	<ul style="list-style-type: none"> <li>RV609/DEC-49P(B-4)</li> </ul>

### 11-2-9. Blanking Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN : color bar signal</li> <li>EE mode</li> </ul>	<p>CH-1 : TP6/DEC-49P(C-4) CH-2 : TP14/DEC-49P(D-3)</p> <p>A = <math>9.8 \pm 0.1 \mu\text{sec}</math></p>	RV608/DEC-49P(B-4)

### 11-2-10. DEC HUE Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN : color bar signal (100-100-0)</li> <li>EE mode</li> </ul>	<p>CH-1 : TP14/DEC-49P(D-3) CH-2 : TP15/DEC-49P(D-3)</p> <p>Minimize A</p> <p>TRIG: TP20/DEC-49P(C-4)</p>	RV607/DEC-49P(B-1)

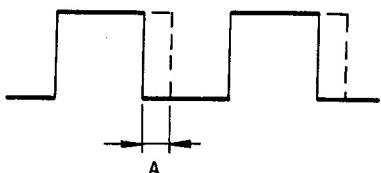
### 11-2-11. Blanking Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN : color bar signal</li> <li>EE mode</li> </ul>	<p>TP14/DEC-49P(D-3)</p> <p>A = <math>0 \pm 4</math> mV</p> <p>TRIG: TP20/DEC-49P(C-4)</p>	• RV602/DEC-49P(D-2)
	<p>TP15/DEC-49P(D-3)</p> <p>A = <math>0 \pm 4</math> mV</p> <p>TRIG: TP20/DEC-49P(C-4)</p>	• RV606/DEC-49P(C-2)

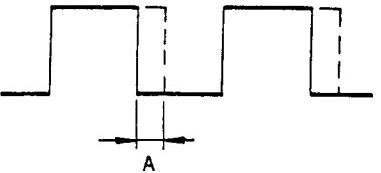
### 11-3. CEC BOARD ALIGNMENT

#### 11-3-1. Chroma AFC 1/8 Clock Adjustment

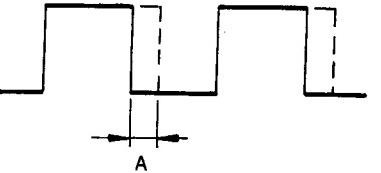
Step. 1

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-2A PS.</li> </ul>	TP504/CEC-3P(B-3)  Minimize the clock deflection. $A=0\pm20\text{ nsec}$	RV503/CEC-3P(A-3)

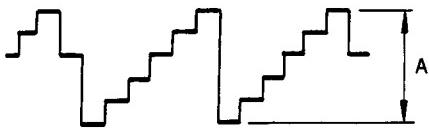
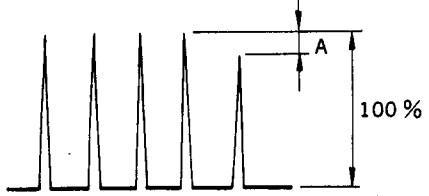
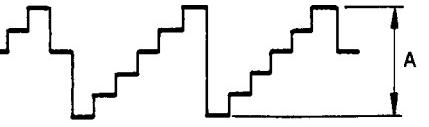
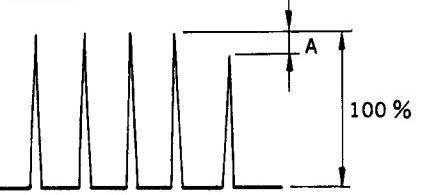
Step. 2

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> </ul>	TP504/CEC-3P(B-3)  Minimize the clock deflection. $A=0\pm20\text{ nsec}$	RV506/CEC-3P(A-1)

#### 11-3-2. Y AFC 1/8 Clock Adjustment

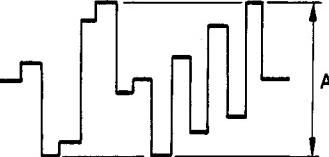
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-2A PS.</li> </ul>	TP505/CEC-3P(B-3)  Minimize the clock deflection. $A=0\pm20\text{ nsec}$	RV505/CEC-3P(A-3)

### 11-3-3. Expand/Compress CCD Linearity Adjustment

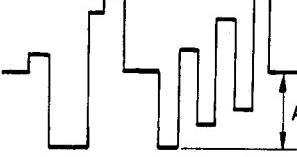
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Turn the RV1 on the LM-16 Board (E-2) fully clockwise direction.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 5-step signal</li> <li>EE mode</li> <li>Waveform monitor: DIFF'D STEP mode</li> <li>Turn the RVs on the DL-15 Board [A152 through A155] fully counterclockwise direction.</li> </ul>	pin 31 of CN1/CEC-3P(C-4)  Spec 1. $A = 0.47 \pm 0.01\text{V}$ TRIG: TP152/CEC-3P(D-3)	Spec 1: Step 1. <input checked="" type="checkbox"/> RV11/DL-15[A152](C-1) Step 2. <input checked="" type="checkbox"/> RV11/DL-15[A153](A-1) Step 3. <input checked="" type="checkbox"/> RV21/DL-15[A152](B-1) Step 4. <input checked="" type="checkbox"/> RV21/DL-15[A153](B-1)
	pin 31 of CN1/CEC-3P(C-4) waveform monitor  Spec 2. $A = 0 \pm 4\%$	Spec 2: Step 1. <input checked="" type="checkbox"/> RV12/DL-15[A152](C-1) Step 2. <input checked="" type="checkbox"/> RV12/DL-15[A153](A-1) Step 3. <input checked="" type="checkbox"/> RV22/DL-15[A152](B-1) Step 4. <input checked="" type="checkbox"/> RV22/DL-15[A153](B-1)
	pin 31 of CN1/CEC-3P(C-4)  Step 3. $A = 0.93 \pm 0.01\text{V}$	Spec 3.: Step 1. <input checked="" type="checkbox"/> RV11/DL-15[A154](C-1) Step 2. <input checked="" type="checkbox"/> RV11/DL-15[A155](A-2) Step 3. <input checked="" type="checkbox"/> RV21/DL-15[A154](B-1) Step 4. <input checked="" type="checkbox"/> RV21/DL-15[A155](B-2)
	pin 31 of CN1/CEC-3P(C-4) waveform monitor  Spec 4. $A = 0 \pm 4\%$	Spec 4: Step 1. <input checked="" type="checkbox"/> RV12/DL-15[A154](C-1) Step 2. <input checked="" type="checkbox"/> RV12/DL-15[A155](A-2) Step 3. <input checked="" type="checkbox"/> RV22/DL-15[A154](B-1) Step 4. <input checked="" type="checkbox"/> RV22/DL-15[A155](B-2)

- After the adjustment, perform 11-3-5. Chroma Limiter Adjustment.

#### 11-3-4. Expand/Compress CCD Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• EE mode</li> </ul>	pin 31 of CN1/CEC-3P(C-4)  A=0.93±0.01V TRIG: TP152/CEC-3P(D-3)	<input checked="" type="checkbox"/> RV11/DL-15[A154](C-1) <input checked="" type="checkbox"/> RV21/DL-15[A154](B-1) <input checked="" type="checkbox"/> RV11/DL-15[A155](B-2) <input checked="" type="checkbox"/> RV21/DL-15[A155](A-2)

#### 11-3-5. Chroma Limiter Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO IN: color bar signal (chroma: +6dB)</li> <li>• EE mode</li> </ul>	pin 31 of CN1/CEC-3P(C-4)  A=0.62±0.01 V	<input checked="" type="checkbox"/> RV1/LM-16(E-2)

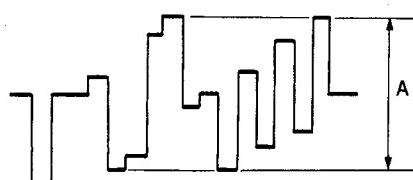
### 11-3-6. CTDM Compress Start Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW : CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> </ul>	<p>CH-1: TP132/ENC-6P(G-2) CH-2 : TP7/CEC-3P(E-4)</p>	• RV502/CEC-3P(B-3)

### 11-3-7. Pre φ CCD Linearity Adjustment

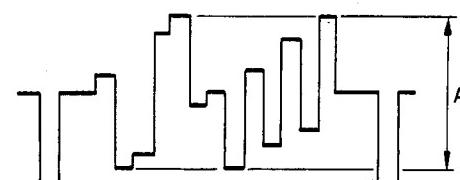
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the C Linearity signal on the alignment tape CR51B PS.</li> <li>Waveform monitor: DIFF'D STEP mode</li> <li>After the adjustment, solder the slit to the former position.</li> </ul>	<p>TP1/CEC-3P(G-2)</p>	• RV1/DL-14[A101](E-4)

### 11-3-8. Pre $\phi$ CCD Output Level Adjustment

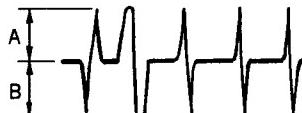
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP1/CEC-3P(G-2)  $A = 0.93 \pm 0.01\text{V}$	• RV2/CEC-3P(G-3)

### 11-3-9. C Nonlinear De-emphasis Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP2/CEC-3P(F-2)  $A = 0.93 \pm 0.01\text{V}$	• RV1/NR-18(G-4)

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> <li>Turn RV4 on the NR-18 Board (G-4) to the mechanical center position.</li> </ul>	TP15/NR-18(G-4)  $A = B$	• RV3/NR-18(G-4)

Step 3.

Machine conditions for adjustment	Specifications	Adjustments												
• Play back the multi burst signal on the alignment tape CR5-1B PS.	TP2/CEC-3P(F-2) <p>0.5 1 2 3 MHz</p> <p>NG</p> <p>NG</p> <p>OK</p>	<input checked="" type="checkbox"/> RV4/NR-18(G-4)												
	<p>Make flat low-pass frequency response (0 through 1 MHz).</p> <p>0.5 1 2 3 MHz</p> <p>NG</p> <p>NG</p> <p>OK</p>	<input checked="" type="checkbox"/> RV2/NR-18(G-4) <ul style="list-style-type: none"> <li>• Alternately adjust RV4 and RV2 so that the frequency response meet the specification.</li> </ul>												
	<p>Adjust high-pass frequency response (1 through 3 MHz) to meet the specification.</p> <table border="1"> <thead> <tr> <th>frequency</th> <th>level</th> </tr> </thead> <tbody> <tr> <td colspan="2">left edge (Ref)</td> </tr> <tr> <td>0.5 MHz</td> <td>100±5%</td> </tr> <tr> <td>1 MHz</td> <td>100±5%</td> </tr> <tr> <td>2 MHz</td> <td>100±5%</td> </tr> <tr> <td>3 MHz</td> <td>95±5%</td> </tr> </tbody> </table>	frequency	level	left edge (Ref)		0.5 MHz	100±5%	1 MHz	100±5%	2 MHz	100±5%	3 MHz	95±5%	
frequency	level													
left edge (Ref)														
0.5 MHz	100±5%													
1 MHz	100±5%													
2 MHz	100±5%													
3 MHz	95±5%													

Step 4.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Playback the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP2/CEC-3P(F-2)  $A = 0.93 \pm 0.01V$	<input checked="" type="checkbox"/> RV1/NR-18(G-4)

### 11-3-10. C Noise Canceller Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-2A PS.</li> </ul>	TP2/CEC-3P(F-2)  $A = 0.7 \pm 0.01V$	<input checked="" type="checkbox"/> RV5/NR-18(G-4)

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the quad phase signal portion on the alignment tape CR5-2A PS.</li> </ul>	TP2/CEC-3P(F-2)  Minimize the overshoot or smear.  Minimize the noise.	<input checked="" type="checkbox"/> RV7/NR-18(G-4) <input checked="" type="checkbox"/> RV6/NR-18(G-4) <ul style="list-style-type: none"> <li>Alternately adjust RV6 and RV7 to meet the specification.</li> </ul>

### 11-3-11. Pre $\phi$ C SH Adjustment

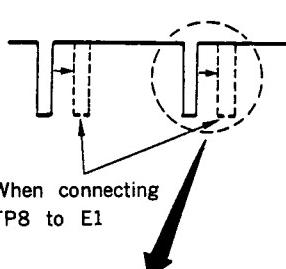
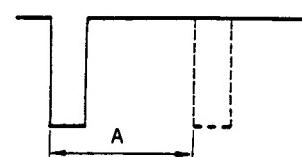
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	<p>CH-1: TP2/CEC-3P(F-2) CH-2: TP7/CEC-3P(E-4)</p> <p>A=2.30±0.05μsec</p>	• RV501/CEC-3P(A-1)

### 11-3-12. Pre $\phi$ Y SH Adjustment

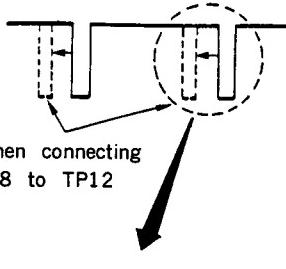
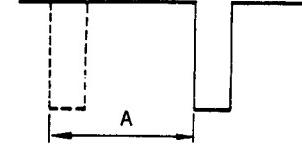
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	<p>CH-1: TP6/CEC-3P(E-4) CH-2: TP7/CEC-3P(E-4)</p> <p>A=0.85±0.05μsec (center of jitter)</p>	• RV4/CEC-3P(F-3)

### 11-3-13. Pre $\phi$ Limiter Adjustment

Step 1.

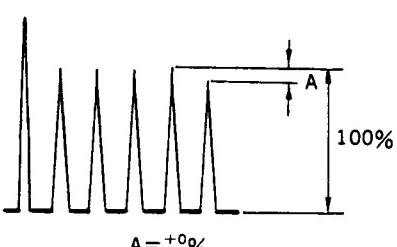
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect TP8 on the CEC-3P Board (G-4) to E1 on the CEC-3P Board (F-2) with a shorting clip.</li> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP7/CEC-3P(E-4)   <p>A = <math>16 \pm 2 \mu\text{sec}</math> Read at the top of jitter.</p>	<span style="color: red;">●</span> RV2/LM-15[A105](E-3) TRIG: TP6/CEC-3P(E-4)

Step 2.

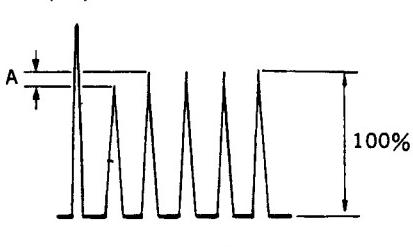
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect TP8 on the CEC-3P Board (G-4) to TP12 on the CEC-3P Board (E-4) with a shorting clip.</li> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP7/CEC-3P(E-4)   <p>A = <math>16 \pm 2 \mu\text{sec}</math> Read at the top of jitter.</p>	<span style="color: red;">●</span> RV1/LM-15[A105](E-3) TRIG: TP6/CEC-3P(E-4)

### 11-3-14. DUB CTDM Linearity Adjustment

Step 1.

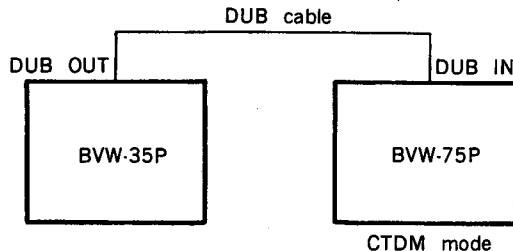
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the C linearity signal on the alignment tape CR5-1B PS.</li> <li>Waveform monitor: DIFF'D STEP mode</li> </ul>	TP3/CEC-3P(G-1) 	• RV1/DL-14[A103](G-1)

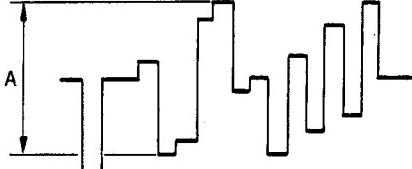
Step 2.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the C linearity signal on the alignment tape CR5-1B PS.</li> <li>Waveform monitor: DIFF'D STEP mode</li> </ul>	TP4/CEC-3P(F-2) 	• RV1/DL-14[A104] (G-1)

### 11-3-15. DUB CTDM Level Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> <li>After the adjustment, remove the DUB cable.</li> </ul>	TP5/CEC-3P(D-4)   $A = 0.62 \pm 0.01\text{V}$	<input checked="" type="checkbox"/> RV3/CEC-3P(G-2)

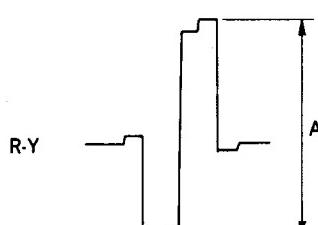
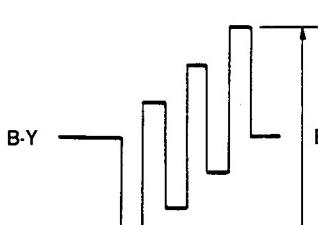
### 11-3-16. R-Y Comb CCD Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP11/CEC-3P(D-3)   Spec 1. Symmetrize the waveform. Spec 2. Minimize the level. $(A \leq 0.2\text{V})$	Spec 1. <input checked="" type="checkbox"/> RV21/DL-17(C-4) Spec 2. <input checked="" type="checkbox"/> RV22/DL-17(C-4) <ul style="list-style-type: none"> <li>Alternately adjust until specification 2 is satisfied.</li> </ul>

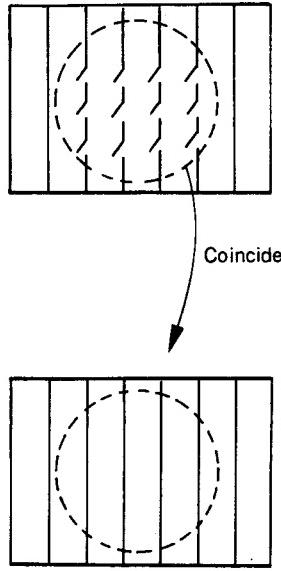
### 11-3-17. B-Y Comb CCD Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP10/CEC-3P(D-4)  Spec 1. Symmetrize the waveform. Spec 2. Minimize the level. $(A \leq 0.2V)$ TRIG: TP1/CEC-3P(G-2)	Spec 1. <input checked="" type="checkbox"/> RV11/DL-17(C-2) Spec 2. <input checked="" type="checkbox"/> RV12/DL-17(C-2) <ul style="list-style-type: none"> <li>Alternately adjust until specification 2 is satisfied.</li> </ul>

### 11-3-18. Expanded Output Level Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set S1 on the CEC-3P Board (G-3) to ON.</li> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP14/CEC-3P(E-4)  $A = 0.70 \pm 0.05V$	<input checked="" type="checkbox"/> RV151/CEC-3P(B-2)
	TP13/CEC-3P(D-4)  $B = 0.70 \pm 0.05V$	<input checked="" type="checkbox"/> RV152/CEC-3P(B-2)

### 11-3-19. Free-Run Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar (DO) signal portion on the alignment tape CR5-1B PS.</li> <li>Turn the TRACKING control VR counterclockwise or clockwise direction to generate the chroma tearing by sync disturbance.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p>  <p>When turning the TRACKING control VR counterclockwise or clockwise direction, the chroma tearing by sync disturbance should not appear.      *Red or green noise may appear.      This noise is not related to this adjustment.</p>	• RV504/CEC-3P(A-2)

## 11-4. ENC BOARD ALIGNMENT

### 11-4-1. Y Pedestal Difference in Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>Waveform monitor</li> </ul>	<p>VIDEO OUT connector (terminated at 75ohms)</p>	• RV130/ENC-11P(G-3)

### 11-4-2. Y Sync Replacement Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>Set S1 on the ENC-11P Board (C-1) to ON.</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>Waveform monitor</li> <li>After the adjustment, set S1 on the ENC-11P Board (C-1) to OFF.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p>	• RV131/ENC-11P(H-2)

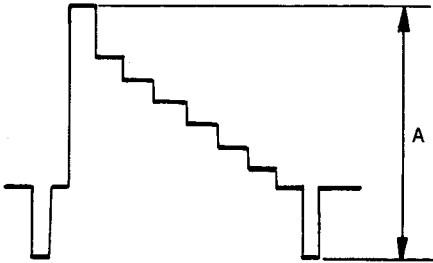
### 11-4-3. Y Pedestal Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>Set S1 on the ENC-11P Board (C-1) to ON.</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>After the adjustment, set S1 on the ENC-11P Board (C-1) to OFF.</li> </ul>	TP133/ENC-11P(E-1)  $A = 0 \pm 0.01 \text{ Vdc}$	RV137/ENC-11P(F-1)

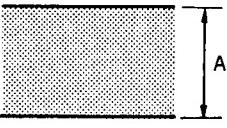
### 11-4-4. Y EE Output Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>Set S1 on the ENC-11P Board (C-1) to ON.</li> <li>CAMERA IN: color bar signal (100% White)</li> <li>EE mode</li> <li>Waveform monitor</li> <li>After the adjustment, set S1 on the ENC-11P Board (C-1) to OFF.</li> </ul>	VIDEO OUT connector (terminated at 75 ohms)  $A = 1.00 \pm 0.01 \text{ V}$	RV134/ENC-11P(G-1)

#### 11-4-5. Y DUB Out Adjustment

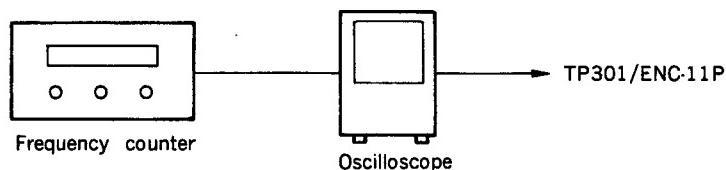
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Connect the DUB OUT to the DUB IN on the BVW-75P with a DUB cable.</li> <li>• S1/ENC-11P(C-1): ON</li> </ul> <p>Step. 1 PB mode</p> <ul style="list-style-type: none"> <li>• BVW-75P : CTDM mode</li> <li>• Play back the color bar signal on the alignment tape CR5-1B PS (Metal mode adj.) CR5-2A PS (Oxide mode adj.)</li> </ul> <p>Step. 2 EE mode</p> <ul style="list-style-type: none"> <li>• BVW-75P: Y-R, B mode</li> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: Color bar signal (100% WHITE)</li> <li>• EE mode</li> <li>• After the adjustment, set S1 on the ENC-11P Board (C-1) to OFF, and remove the DUB cable.</li> </ul>	TP402/ENC-11P(E-4)  <p>PB mode } EE mode } <math>A = 1.0 \pm 0.01V</math></p>	Step. 1 Metal mode <input checked="" type="radio"/> RV411/ENC-11P(E-3) Oxide mode <input checked="" type="radio"/> RV100/ENC-11P(G-4) Step. 2 <input checked="" type="radio"/> RV132/ENC-11P(G-2)

#### 11-4-6. SC Tuning Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• EE mode</li> </ul>	TP301/ENC-11P(D-3)  <p>Maximize A (<math>A \approx 3 V</math>)</p>	<input checked="" type="radio"/> LV321/ENC-11P(D-3)

### 11-4-7. 4.43MHz OSC Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Wait for more than three minutes after the power is turned on.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>Frequency counter</li> </ul>	TP301/ENC-11P(D-3)  4.433619MHz±5 Hz	CV351/ENC-11P(C-2)

### 11-4-8. Clamp Pulse Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Waveform monitor</li> <li>EE mode</li> <li>Wait for more than one minute and thirty seconds after the EE mode.</li> </ul>	CH-1: TP501/ENC-11P(C-3) CH-2: TP506/ENC-11P(A-4)   A=8.1±0.05μs	RV504/ENC-11P(A-4)

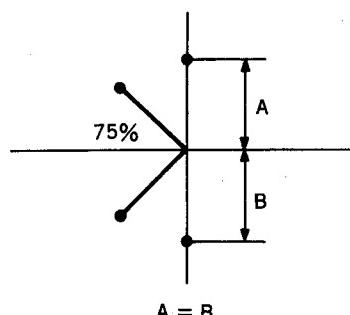
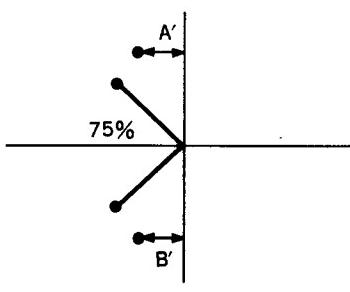
#### 11-4-9. Chroma Blanking Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• Waveform monitor</li> <li>• EE mode</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p>	<p>B-Y(H axis) ● RV202/ENC-11P(G-3)</p> <p>R-Y(V axis) ● RV242/ENC-11P(E-3)</p> <ul style="list-style-type: none"> <li>• Alternately adjust</li> </ul>

#### 11-4-10. Chroma Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• Waveform monitor</li> <li>• EE mode</li> <li>• Wait for more than one minute and thirty seconds after the EE mode.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p>	<p>● RV201/ENC-11P(G-3)</p> <p>● RV241/ENC-11P(E-3)</p> <ul style="list-style-type: none"> <li>• Alternately adjust.</li> </ul>

### 11-4-11. Chroma Balance Vertical Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: PHASE-90(P-90)</li> <li>• EE mode</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms.)</p> <p>When the luminescent spot is in the vertical line vectorscope</p>  $A = B$ <p>When the luminescent spot is in the horizontal line vectorscope</p>  $A' = B'$	◎RV302/ENC-11P(D-3)

#### 11-4-12. Chroma Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>Set the vectorscope gain to UNCAL, and adjust so that R and C<sub>Y</sub> are located in "田".</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>Luminescent spots on vectorscope</p> <p>○ : OK ● : NG</p> <p>Repeat until twelve luminescent spots satisfy the specification.</p>	② RV203/ENC-11P(F-3)

#### 11-4-13. Burst Balance/Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>Set the vectorscope gain to UNCAL, and adjust so that the 12 luminescent spots are located in "田".</li> <li>After the adjustment, set the vectorscope gain to CAL.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>vectorscope</p> <p>○ : OK ● : NG</p> <p>75%</p> <p>Balance Adj :The burst level should be same. Level Adj :Place the luminescent spot of burst at 75% position on the BURST axis.</p>	<p>Balance</p> <p>② RV243/ENC-11P(E-2)</p> <p>Level</p> <p>② RV301/ENC-11P(D-3)</p>

#### 11-4-14. Chroma Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>vectorscope Burst's luminescent spot: 75%</p> <p>75%</p> <p>12 luminescent spots: a half part of the luminescent spot should be located in "■" respectively.</p>	<p>RV135/ENC-11P(F-1)</p>

#### 11-4-15. Video Out Y/C Delay Adjustment

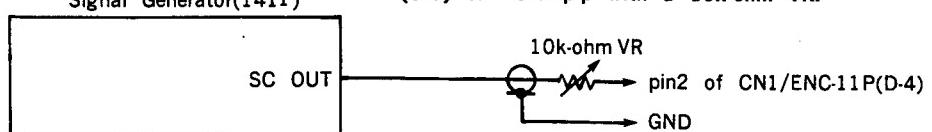
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: pulse/bar signal</li> <li>EE mode</li> <li>Set the line selector in the waveform monitor to OFF.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>The peak is located in the center.</p> <p>Spec.1</p> <p>[NOTE] Check that the specifications 1 and 2 are satisfied on condition that each video board is directly connected to the main unit without an EX-150 extension board.</p>	<p>RV133/ENC-11P(G-1)</p> <p>When the peak is not satisfied the specification.</p> <p>DL101/ENC-11P(H-1) soldering side</p> <p>• Adjust with RV133 changing the tap.</p>

### 11-4-16. SC Leak Cancel Adjustment

#### [Connection]

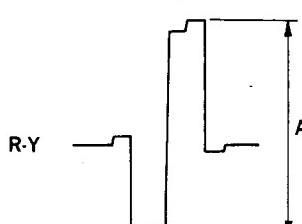
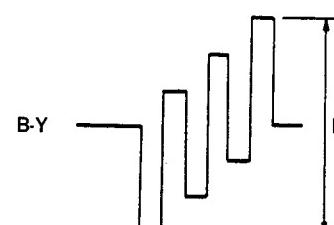
\*Adjust the SC leak of TP131 on the ENC-11P Board

(G-3) to 18 mVp-p with a 10k-ohm VR.

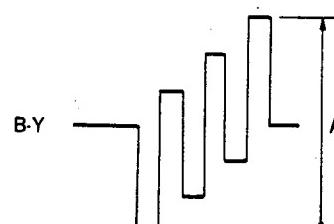


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Set S1 on the ENC-11P Board (C-1) to ON.</li> <li>EE mode</li> <li>Waveform monitor</li> <li>After the adjustment, set S1 on the ENC-11P Board (C-1) to OFF.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>The waveform diagram illustrates the cancellation of SC leak. It shows a clean rectangular pulse followed by a series of smaller, irregular pulses representing the SC leak. A legend indicates that the dark steps represent the SC leak. The text "Minimize the SC leak level" is present below the waveform.</p> <p>■: SC leak</p> <p>Minimize the SC leak level</p>	<p>level adjustment  <input checked="" type="radio"/> RV136/ENC-11P(F-1)</p> <p>phase adjustment  <input checked="" type="radio"/> RV138/ENC-11P(E-2)</p>

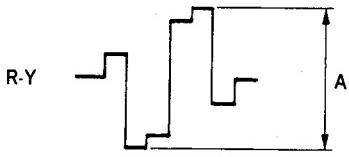
### 11-4-17. Chroma DUB Out Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Connect DUB OUT to DUB IN on the BVW-75P with DUB cable.</li> <li>• VIDEO SW: CAMERA</li> <li>• BVW-75P: Y-R, B mode</li> <li>• CAMERA IN: color bar signal</li> <li>• EE mode</li> </ul>	TP404/ENC-11P(E-4)  A = 0.70±0.01 V	R-Y <span style="color: red;">●</span> RV431/ENC-11P(E-3)
	TP403/ENC-11P(E-4)  B = 0.70±0.01 V	B-Y <span style="color: red;">●</span> RV421/ENC-11P(E-3)

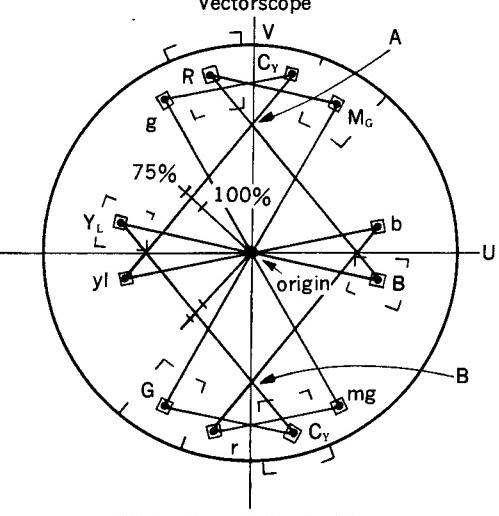
### 11-4-18. B-Y Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO IN : color bar signal (100/0/100/0)</li> <li>• EE mode</li> </ul>	TP14/DEC-49P(C-3) TP403/ENC-11P(E-4)  A=0.70±0.01 V	<span style="color: red;">●</span> RV351/DEC-49P(E-1)

### 11-4-19. R-Y Level Adjustment

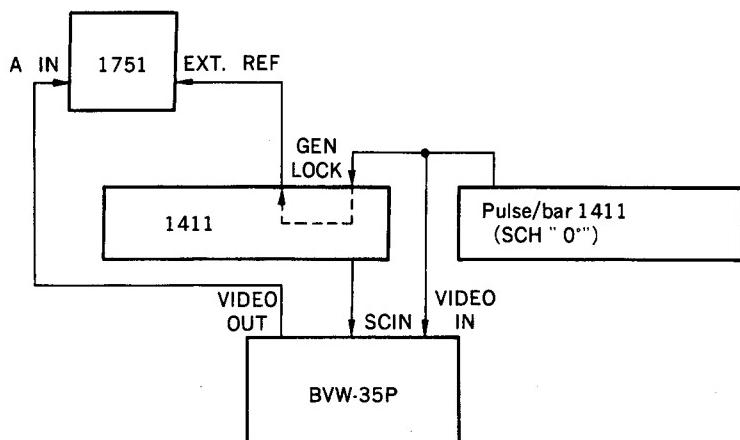
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (100/0/100/0)</li> <li>EE mode</li> </ul>	TP15/DEC-49P(D-3) TP404/ENC-11P(E-4) <p style="text-align: center;">    <math>A = 0.70 \pm 0.01 \text{ Vp-p}</math> </p>	RV605/DEC-49P(C-1)

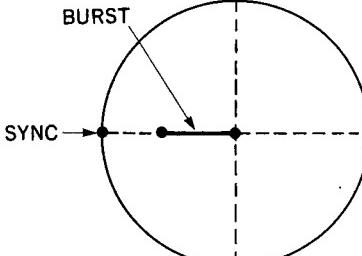
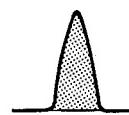
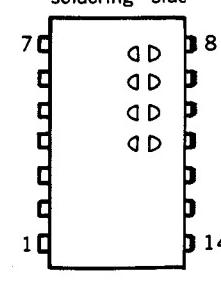
### 11-4-20. CC Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (REVERSE)</li> <li>EE mode</li> </ul>	VIDEO OUT connector(terminated at 75ohms) <p style="text-align: center;">    Points A and B should correspond to the V axis. </p>	RV604/DEC-49P(C-2)

#### **11-4-21. Composite Y/C Delay Adjustment**

## [Connection]

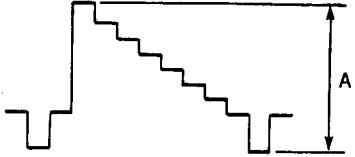
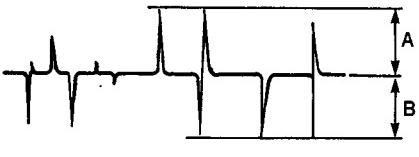


Machine conditions for adjustment	Specifications	Adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>• TBC SW: ON</li> <li>• VIDEO IN: pulse/bar signal</li> <li>• EE mode</li> <li>• 1751: SCH mode</li> </ul>	 <p>BURST phase <math>0 \pm 5</math> degrees (against the sync)</p>	SC dial/1411
<p>Step. 2</p> <ul style="list-style-type: none"> <li>• TBC SW: ON</li> <li>• VIDEO IN: pulse/bar signal</li> <li>• EE mode</li> <li>• 1751: WFM mode</li> </ul>	<p>VIDEO OUT connector(terminated at 75ohms)</p> <p>MOD 10T portion</p>   <p>(<math>0 \pm 5</math>nsec)</p> <p>[NOTE] Check that the specification 1 and 2 are satisfied on condition that each video board is directly connected to the main unit without an extension board.</p>	<p>② RV504/DEC-49P(E-2)</p> <ul style="list-style-type: none"> <li>• When the specification is not satisfied, adjust again changing the tap of DL-502 on the DEC-49P Board. (SL501~504)</li> </ul> 

After the adjustment, perform check item in the following adjustment.

- 11-7-1. VISC Adjustment
  - 11-7-3. CF ID Pulse Adjustment

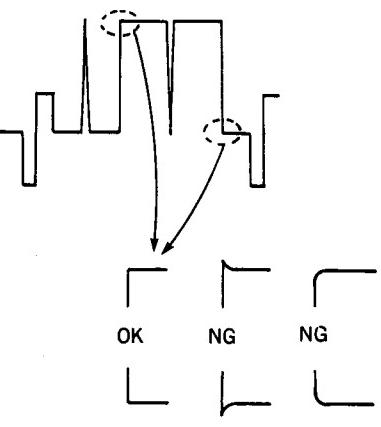
### 11-4-22. Y Nonlinear De-emphasis Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1  • Play back the color bar signal on the alignment tape CR5-1B PS.	TP131/ENC-11P(G-3)   $A = 1.0 \pm 0.01 \text{ V}$	Ⓐ RV101/ENC-11P(H-4)
Step. 2  • Play back the pulse/bar signal on the alignment tape CR5-1B PS.	TP101/ENC-11P(G-4)   $A = B$	Ⓐ RV102/ENC-11P(G-3)

Machine conditions for adjustment	Specifications	Adjustments
<p>Step. 3</p> <ul style="list-style-type: none"> <li>Play back the gated sweep signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP131/ENC-11P(G-3)</p> <p>0.5 1 2 3 MHz</p> <p>OK</p> <p>NG</p> <p>NG</p> <p>OK</p>	<p>• RV103/ENC-11P(H-3)</p>
	<p>Make flat the frequency response in low frequency level (0 through 1 MHz).</p> <p>0.5 1 2 3 MHz</p> <p>OK</p> <p>NG</p> <p>NG</p> <p>OK</p>	<p>• RV104/ENC-11P(H-4)</p> <ul style="list-style-type: none"> <li>Alternately adjust RV103 and RV104 to meet the specification.</li> </ul>

Adjust the high frequency level. (2 through 4 MHz)

frequency	level
0.5 MHz	100%(reference)
1 MHz	100±4 %
2 MHz	100±6 %
3 MHz	100±6 %
4 MHz	100±6 %
5 MHz	100 $\pm$ 6 %

Machine conditions for adjustment	Specifications	Adjustments
<p>Step. 4</p> <ul style="list-style-type: none"> <li>Play back the pulse/bar signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP131/ENC-11P(G-3)</p>  <p>Check the waveform. When the specification is not satisfied, perform step 2 and 3 again.</p>	

### 11-4-23. PB Y/C Delay Adjustment

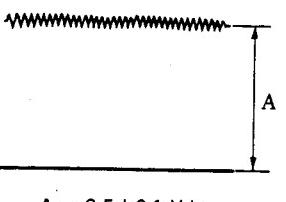
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the bowtie &amp; 10T signal on the alignment tape CR5-1B PS.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>The peak should be located in the center.</p> <p>OK      OK      NG      NG Y delayed      Y advanced</p>	
<ul style="list-style-type: none"> <li>Set the line selector on the waveform monitor to 15 LINE.</li> </ul>	<p>Spec. 1</p> <p><math>0 \pm 10 \text{ nsec}</math></p>	• RV501/ENC-11P(C-2)
<ul style="list-style-type: none"> <li>Set the line selector on the waveform monitor to 15 LINE, and FIELD switch to 1+3 and 2+4.</li> </ul>	<p>Spec. 2 Difference between fields</p> <p><math>0 \pm 20 \text{ nsec}</math></p> <p>CH-A: 1+3, CH-B: 2+4</p>	

[ NOTE ] Check that the specification 1 and 2 are satisfied on condition that each video board is directly connected to the main unit without an extension board.

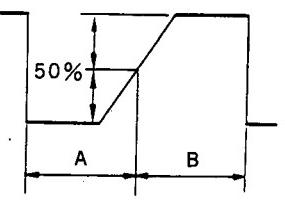
### 11-4-24. False H Sync Frequency Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-2A PS.</li> </ul>	<p>TP505/ENC-11P(C-4)</p> <p><math>A = 68 \pm 1 \mu\text{sec}</math></p>	• RV503/ENC-11P(B-4)

#### 11-4-25. H-AFC Error Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal • EE mode	TP503/ENC-11P(B-3) 	• LV551/ENC-11P(B-3)

#### 11-4-26. H-AFC VCO Duty Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal • EE mode	TP504/ENC-11P(B-3) 	• RV502/ENC-11P(A-3)

#### 11-4-27. PB DUB OUT Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	<p>DUB OUT connector (terminated at 75 ohms)</p> <p>R-Y</p> <p>A = <math>0.70 \pm 0.01</math> V</p> <p>B-Y</p> <p>B = <math>0.70 \pm 0.01</math> V</p>	<p>• RV151/CEC-3P(B-2)</p> <p>• RV152/CEC-3P(B-2)</p>

#### 11-4-28. Video Out Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>A = <math>1.0 \pm 0.01</math> V</p>	<p>• RV505/DEC-49P(E-2)</p>

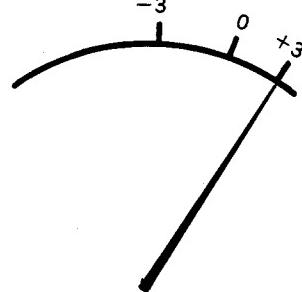
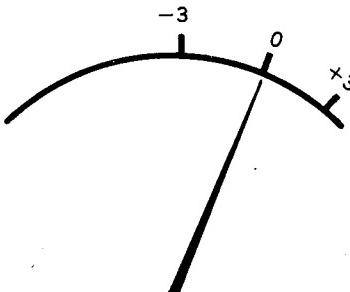
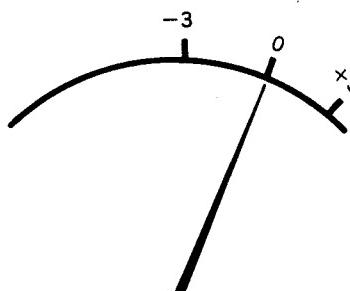
### 11-4-29. DEC Vector Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms) vectorscope</p> <p>Each spot should be located in each smaller frame.</p>	<ul style="list-style-type: none"> <li>RV351/DEC-49P(E-1)</li> <li>RV605/DEC-49P(C-1)</li> </ul>

### 11-4-30. VITC Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>VITC REC SW: ON (front panel)</li> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> <li>Waveform monitor</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>A = 0.56±0.03 V</p>	<ul style="list-style-type: none"> <li>RV511/DEC-49P(E-3)</li> </ul>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>VITC REC SW: ON (front panel)</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>Waveform monitor</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>A = 0.56±0.03 V</p>	<ul style="list-style-type: none"> <li>RV510/DEC-49P(C-3)</li> </ul>

### 11-4-31. Video Meter Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>• METER select SW: VIDEO (front panel)</li> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• EE mode</li> <li>• Put the main unit vertically.</li> </ul>	<p>CH-1/CH-2 level meter</p>  <p>The pointer reading should be "+3".</p>	<p>CH-1 meter ②RV9/MT-34</p> <p>CH-2 meter ②RV10/MT-34</p>
	<p>CH-3 level meter</p>  <p>The pointer reading should be "0".</p>	<p>CH-3 meter ②RV11/MT-34</p>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>• METER select SW: VIDEO (front panel)</li> <li>• VIDEO IN: color bar signal</li> <li>• EE mode</li> <li>• Put the unit perpendicular to the floor.</li> </ul>	<p>CH-4 level meter</p>  <p>The pointer reading should be "0".</p>	<p>CH-4 meter ②RV12/MT-34</p>

## 11-5. MDM BOARD ALIGNMENT (EE SYSTEM)

### 11-5-1. Y Ref Sync Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 50% flat field signal</li> <li>EE mode</li> </ul>	<p>TP102/MDM-3P(C-2)</p> <p>A : B = 4 : 5</p> <p>TRIG: TP101/MDM-3P(B-3)</p>	• RV101/MDM-3P(B-2)

### 11-5-2. Y Ref Sync Position Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 50% flat field signal</li> <li>EE mode</li> </ul>	<p>TP102/MDM-3P(C-2)</p> <p>Delay</p> <p>50%</p> <p>50%</p> <p>A</p> <p><math>A = 2.65 \pm 0.02 \mu\text{sec}</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	• RV611/TG-31(A-2)

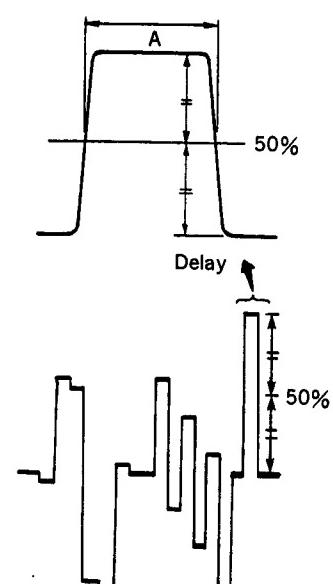
### 11-5-3. Y Ref Sync Width Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: 50% flat field signal</li> <li>• EE mode</li> </ul>	<p>TP102/MDM-3P(C-2)</p> <p>Delay</p> <p>50%</p> <p>A = <math>5 \pm 0.05 \mu\text{sec}</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	• RV612/TG-31(B-2)

### 11-5-4. C Ref Sync Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: 75% color bar signal</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• EE mode</li> </ul>	<p>TP202/MDM-3P(B-2)</p> <p>A</p> <p>B</p> <p>With respect to video level A (100 %), the sync level is as follows: <math>B = 120 \pm 2\%</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	• RV201/MDM-3P(A-2)

### 11-5-5. C Ref Sync Width Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: 75% color bar signal</li> <li>• EE mode</li> </ul>	<p>TP202/MDM-3P(B-2)</p>  <p>A</p> <p>50%</p> <p>Delay</p> <p>50%</p> <p><math>A = 1.9 \pm 0.05 \mu\text{sec}</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	• RV614/TG-31(C-2)

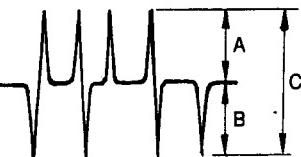
### 11-5-6. C Ref Sync Position Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 50% flat field signal</li> <li>EE mode</li> </ul>	<p>CH-1: TP102/MDM-3P(C-2) CH-2: TP202/MDM-3P(B-2)</p> <p>CH-1</p> <p>CH-2</p> <p>TP102</p> <p>CH-1</p> <p>50%</p> <p>A</p> <p>TP202</p> <p>CH-2</p> <p>50%</p> <p>A = <math>0.25 \pm 0.02 \mu\text{sec}</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	• RV613/TG-31(B-1)

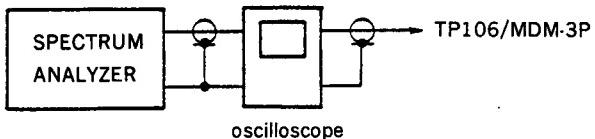
### 11-5-7. Y Pre-emphasis Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 2T pulse/bar signal</li> <li>EE mode</li> </ul>	<p>TP103/MDM-3P(B-2)</p> <p>Spec 1. A=B Spec 2. C=88±2mV</p> <p>TRIG: TP101/MDM-3P(B-3)</p>	<p>Spec 1. • RV102/MDM-3P(B-2)</p> <p>Spec 2. • RV103/MDM-3P(B-2)</p>

### 11-5-8. C Pre-emphasis Mix Level Adjustment

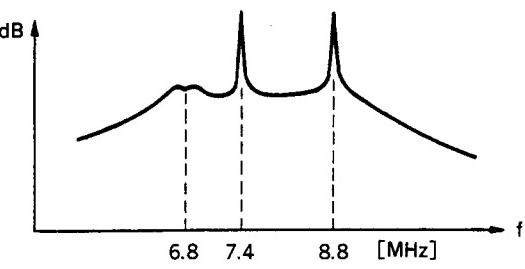
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 2T pulse/bar signal</li> <li>EE mode</li> </ul>	TP203/MDM-3P(A-2)  Spec 1. A=B Spec 2. C=95±2mV TRIG: TP101/MDM-3P(B-3)	Spec 1. <input checked="" type="radio"/> RV202/MDM-3P(A-2) Spec 2. <input checked="" type="radio"/> RV203/MDM-3P(A-2)

### 11-5-9. Y Modulator Deviation/Carrier Set Adjustment

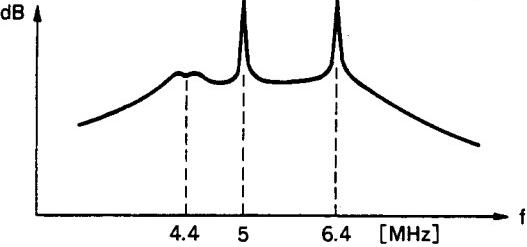


Before performing this adjustment, perform section 11-1-9. Y Output Level Adjustment (MDM-3P Board).

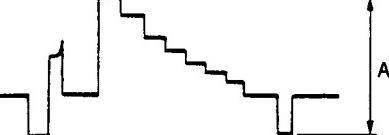
Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: 100% flat field signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>EE mode</li> <li>Adjust with a spectrum analyzer.</li> </ul>	TP106/MDM-3P(B-3)  Deviation adjustment Adjust the gap between two peak values to 1.4 MHz. Carrier adjustment Adjust the small peak value on the left to 6.8 MHz.	Deviation adjustment <input checked="" type="radio"/> RV106/MDM-3P(C-2) Carrier adjustment <input checked="" type="radio"/> RV107/MDM-3P(C-4)

Step 2.

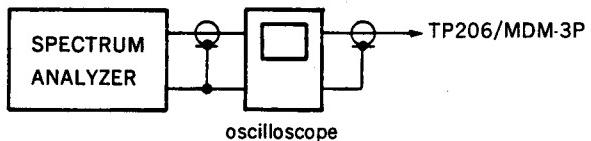
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: 100% flat field signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>EE mode</li> <li>Adjust with a spectrum analyzer.</li> </ul>	TP106/MDM-3P(B-3)  <p>Deviation adjustment Adjust the gap between two peak values to 1.4 MHz Carrier Adjustment Adjust the low peak on the left to 4.4 MHz.</p>	Deviation adjustment <input checked="" type="checkbox"/> RV114/MDM-3P(C-2) Carrier adjustment <input checked="" type="checkbox"/> RV108/MDM-3P(C-4)

Step 3.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Supply 75% color bar signal to the VIDEO IN connector, and put the unit into the self-REC/PB mode.</li> <li>Check with a metal tape and an oxide tape.</li> </ul>	TP306/MDM-3P(F-4)  $A = 1.0 \pm 0.01V$ <p>When the specification is not satisfied, repeat Steps 1. and 2.</p>	

### 11-5-10. C Modulator Deviation/Carrier Set Adjustment

[Connection]



Befor performing this adjustment, perform section 11-1-10. C Output Level Adjustment (MDM-3P Board).

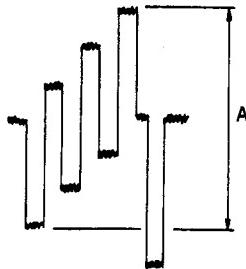
Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: 75% color bar signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>EE mode</li> <li>Adjust with a spectrum analyzer.</li> </ul>	TP206/MDM-3P(A-3) <p>The graph plots dB on the vertical axis against frequency f on the horizontal axis. Two main peaks are visible at 5.6 MHz and 6.6 MHz. A dashed vertical line marks the central frequency at <math>6.1 \pm 0.005</math> MHz.</p>	Deviation adjustment <input checked="" type="checkbox"/> RV206/DV-7 Carrier adjustment <input checked="" type="checkbox"/> RV207/MDM-3P(B-4)

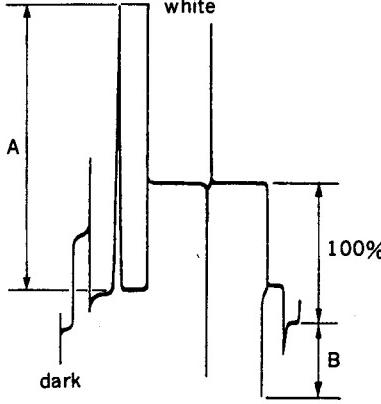
Step 2.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: 75% color bar signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>EE mode</li> <li>Adjust with a spectrum analyzer.</li> </ul>	TP206/MDM-3P(A-3) <p>The graph plots dB on the vertical axis against frequency f on the horizontal axis. Two main peaks are visible at 4.0 MHz and 5.0 MHz. A dashed vertical line marks the central frequency at <math>4.5 \pm 0.005</math> MHz.</p>	Deviation adjustment <input checked="" type="checkbox"/> RV214/DV-7 Carrier adjustment <input checked="" type="checkbox"/> RV208/MDM-3P(B-4)

Step3

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: 75 % color bar signal</li> <li>Self-REC/PB mode</li> <li>Check with a metal tape and an oxide tape.</li> </ul>	TP406/MDM-3P(D-4)  $A = 0.70 \pm 0.01V$ (Measured in the noise center) When the specification is not satisfied, repeat Steps 1. and 2.	

#### 11-5-11. Y White/Dark Clip Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 2T pulse/bar signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>EE mode</li> </ul>	TP105/MDM-3P(B-3)  with respect to VIDEO+SYNC 100% white : A=221.4±2.5% dark : B=65±2.5% TRIG: TP101/MDM-3P(B-3)	white clip adjustment <input checked="" type="checkbox"/> RV104/MDM-3P(B-3) dark clip adjustment <input checked="" type="checkbox"/> RV105/MDM-3P(B-3)

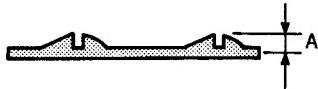
### 11-5-12. Y Dark Clip Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 2T pulse/bar signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>EE mode</li> </ul>	<p>TP105/MDM-3P(B-3)</p> <p>with respect to VIDEO + SYNC 100% dark: <math>B=100 \pm 2.5\%</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	<p>dark clip adjustment • RV113/MDM-3P(B-3)</p>

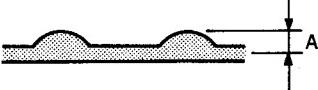
### 11-5-13. C High/Low Clip Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 75% color bar signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>EE mode</li> </ul>	<p>TP205/MDM-3P(A-3)</p> <p>with respect to VIDEO + SYNC 100% high : <math>A=350 \pm 5\%</math> low : <math>B=165 \pm 5\%</math></p> <p>TRIG : TP101/MDM-3P(B-3)</p>	<p>high-clip adjustment • RV204/MDM-3P(A-3)</p> <p>low-clip adjustment • RV205/MDM-3P(A-3)</p>

#### 11-5-14. Y REC HF Adjustment

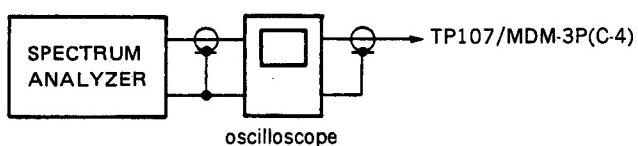
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: H sweep 140% signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>EE mode</li> </ul>	TP108/MDM-3P(C-4)  A = 50 ± 2 mV (measured in the waveform center)	<input checked="" type="checkbox"/> RV109/MDM-3P(C-4)
	TP107/MDM-3P(C-4)  A = 500 ± 10 mV	<input checked="" type="checkbox"/> RV110/MDM-3P(C-4) <b>NOTE:</b> 1. Turn RV110 fully counter-clockwise direction 2. Turn RV110 clockwise little by little, and stop to the point that specification is satisfied.

#### 11-5-15. C REC HF Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: H sweep 140% signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>EE mode</li> </ul>	TP208/MDM-3P(A-3)  A = 20 ± 1 mV (measured in the waveform center)	<input checked="" type="checkbox"/> RV209/MDM-3P(B-3)
	TP207/MDM-3P(A-4)  A = 350 ± 10 mV	<input checked="" type="checkbox"/> RV210/MDM-3P(B-4)

### 11-5-16. Y Modulator Secondary Distortion Adjustment

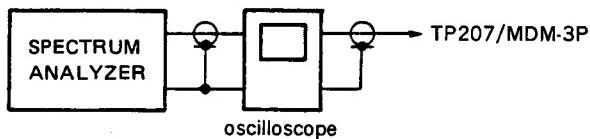
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 50% flat field signal</li> <li>Insert a BCT-20M cassette tape</li> <li>EE mode</li> <li>After the adjustment, insert a BCT-20K cassette tape and check that Spec 2. is satisfied.</li> </ul>	<p>TP107/MDM-3P(C-4)</p> <p>Minimize the second higher harmonic level.</p> <p>Spec 1. <math>A \geq 45\text{dB}</math> (METAL)</p> <p>Spec 2. <math>A \geq 40\text{dB}</math> (OXDIE)</p>	• RV111/MDM-3P(B-4)

### 11-5-17. C Modulator Secondary Distortion Adjustment

[Connection]

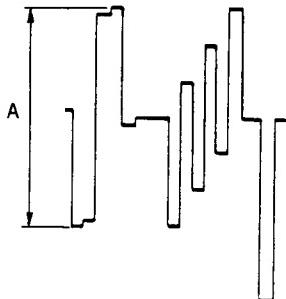


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: flat field 3 signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>EE mode</li> <li>After the adjustment, insert a BCT-20K cassette tape and check that the Spec 2. is satisfied.</li> </ul>	<p>TP207/MDM-3P(A-4)</p> <p>second higher harmonic</p> <p>Minimize the second higher harmonic level.</p> <p>Spec 1. <math>A \geq 45 \text{ dB}</math> (METAL)</p> <p>Spec 2. <math>A \geq 35 \text{ dB}</math> (OXDIE)</p>	• RV211/MDM-3P(A-4)

### 11-5-18 EE DUB Y Output Level Adjustment

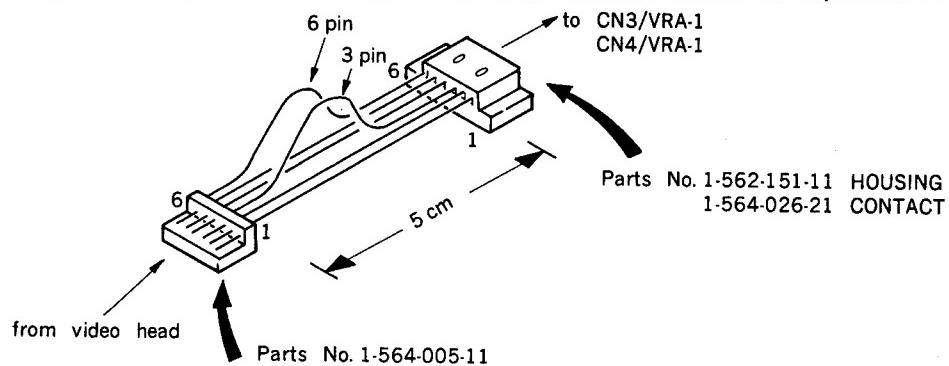
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 75% color bar signal</li> <li>EE mode</li> </ul>	<p>TP306/MDM-3P(F-4)</p> <p><math>A = 1 \pm 0.01 \text{ V}</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	• RV112/MDM-3P(C-2)

### 11-5-19. EE DUB CTDM Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: 75% color bar signal</li> <li>• EE mode</li> </ul>	<p>TP406/MDM-3P(D-4)</p>  <p>A = 0.78 ± 0.01V</p> <p>TRIG: TP101/MDM-3P(B-3)</p>	<p>• RV212/MDM-3P(C-2)</p>

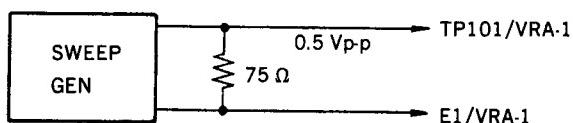
## 11-6. VRA BOARD ALIGNMENT

- When VRA board alignment of S/N 10770 and higher, Prepare the extension harness for adjustment as follows;



### 11-6-1. Y REC Current Frequency Response Adjustment (METAL)

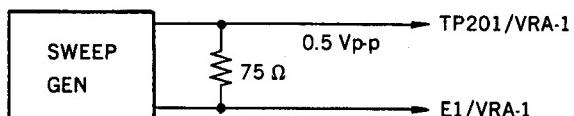
[Connection]



Machine conditions for adjustment	Specifications	Adjustments						
<ul style="list-style-type: none"> <li>Remove CN1 and CN3 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Connect the SWEEP GEN described above, and supply the RF sweep signal.</li> <li>Connect the locally special made extension harness between the CN3 and harness.</li> <li>Connect the current probe to the pin 3 or pin 6 of the extension harness.</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> <li>After the adjustment, mount the CN1 and CN3 on the VRA-1 Board.</li> </ul>	<p>CH-A: Pin 3 of CN3/VRA-1 CH-B: Pin 6 of CN3/VRA-1</p> <p></p> <table border="1"> <thead> <tr> <th>frequency</th> <th>level</th> </tr> </thead> <tbody> <tr> <td>2MHz</td> <td>100% reference</td> </tr> <tr> <td>10MHz</td> <td>70%±20</td> </tr> </tbody> </table> <p>TRIG: TP44/SV-94P(J-1)</p>	frequency	level	2MHz	100% reference	10MHz	70%±20	<p>CH-A: <input checked="" type="checkbox"/> RV107/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV109/VRA-1</p>
frequency	level							
2MHz	100% reference							
10MHz	70%±20							

## 11-6-2. C REC Current Frequency Response Adjustment (METAL)

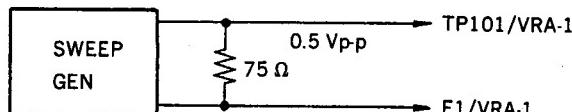
[Connection]



Machine conditions for adjustment	Specifications	Adjustments						
<ul style="list-style-type: none"> <li>Remove CN1 and CN4 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Connect the SWEEP GEN described above, and supply RF sweep signal.</li> <li>Connect the locally special made extension harness between the CN4 and harness.</li> <li>Connect the current probe to the pin 3 or pin 6 of the extension harness.</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> <li>After the adjustment, mount CN1 and CN4 on the VRA-1 Board.</li> </ul>	<p>CH-A: Pin 3 of CN4/VRA-1 CH-B: Pin 6 of CN4/VRA-1</p> <table border="1"> <thead> <tr> <th>frequency</th> <th>level</th> </tr> </thead> <tbody> <tr> <td>2MHz</td> <td>100% reference</td> </tr> <tr> <td>10MHz</td> <td><math>60\%^{+20}_{-10}</math></td> </tr> </tbody> </table> <p>TRIG: TP44/SV-94P(J-1)</p>	frequency	level	2MHz	100% reference	10MHz	$60\%^{+20}_{-10}$	<p>CH-A: <input checked="" type="checkbox"/> RV207/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV209/VRA-1</p>
frequency	level							
2MHz	100% reference							
10MHz	$60\%^{+20}_{-10}$							

### 11-6-3. Y REC Current Frequency Response Adjustment (OXIDE)

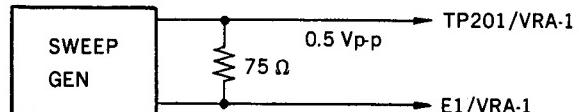
[Connection]



Machine conditions for adjustment	Specifications	Adjustments						
<ul style="list-style-type: none"> <li>Remove CN1 and CN3 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Connect the SWEEP GEN described above, and supply RF sweep signal.</li> <li>Connect the locally special made extension harness between the CN3 and harness.</li> <li>Connect the current probe to the pin 3 or pin 6 of the extension harness.</li> <li>Insert a BCT-20K cassette tape.</li> <li>REC mode</li> <li>After the adjustment, mount CN1 and CN3 on the VRA-1 Board.</li> </ul>	<p>CH-A: Pin 3 of CN3/VRA-1 CH-B: Pin 6 of CN3/VRA-1</p> <table border="1"> <thead> <tr> <th>frequency</th> <th>level</th> </tr> </thead> <tbody> <tr> <td>2MHz</td> <td>100% reference</td> </tr> <tr> <td>10MHz</td> <td>70%<sup>+20</sup>/<sub>-10</sub></td> </tr> </tbody> </table> <p>TRIG: TP44/SV-94P(J-1)</p>	frequency	level	2MHz	100% reference	10MHz	70% <sup>+20</sup> / <sub>-10</sub>	<p>CH-A: <input checked="" type="checkbox"/> RV108/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV110/VRA-1</p>
frequency	level							
2MHz	100% reference							
10MHz	70% <sup>+20</sup> / <sub>-10</sub>							

#### 11-6-4. C REC Current Frequency Response Adjustment (OXIDE)

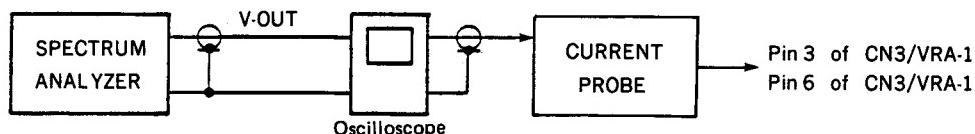
[Connection]



Machine conditions for adjustment	Specifications	Adjustments						
<ul style="list-style-type: none"> <li>Disconnect CN1 and CN4 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Connect the SWEEP GEN described above, and supply RF sweep signal.</li> <li>Connect the locally special made extension harness between the CN4 and harness.</li> <li>Connect the current probe to the pin 3 or pin 6 of the extension harness.</li> <li>Insert a BCT-20K cassette tape.</li> <li>REC mode</li> <li>After the adjustment, connect CN1 and CN4 on the VRA-1 Board.</li> </ul>	<p>CH-A: Pin 3 of CN4/VRA-1 CH-B: Pin 6 of CN4/VRA-1</p> <table border="1"> <thead> <tr> <th>frequency</th> <th>level</th> </tr> </thead> <tbody> <tr> <td>2MHz</td> <td>100% reference</td> </tr> <tr> <td>10MHz</td> <td>60%<sup>+20</sup>/<sub>-15</sub></td> </tr> </tbody> </table> <p>TRIG: TP44/SV-94P(J-1)</p>	frequency	level	2MHz	100% reference	10MHz	60% <sup>+20</sup> / <sub>-15</sub>	<p>CH-A: <input checked="" type="radio"/> RV208/VRA-1</p> <p>CH-B: <input checked="" type="radio"/> RV210/VRA-1</p>
frequency	level							
2MHz	100% reference							
10MHz	60% <sup>+20</sup> / <sub>-15</sub>							

### 11-6-5. Y REC Amp Secondary Distortion Adjustment

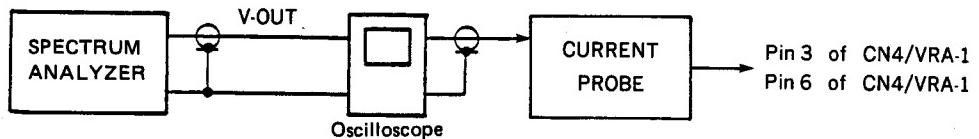
[Connection]

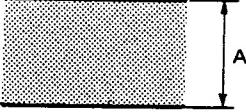
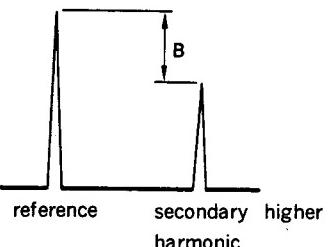


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Remove CN3 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: flat field signal</li> <li>Connect the locally special made extension harness between the CN3 and harness.</li> <li>Connect the current probe to the pin 3 or pin 6 of the extension harness.</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> <li>After the adjustment, mount CN3 on the VRA-1 Board.</li> </ul>	<p>CH-A: Pin 3 of CN3/VRA-1 CH-B: Pin 6 of CN3/VRA-1</p> <p>A = 60±3mAp-p</p> <p>TRIG: TP408/MDM-3P(F-1)</p> <p>spectrum analyzer</p> <p>Minimize the secondary higher harmonic level. (B≥40 dB)</p>	<p>CH-A: <input checked="" type="checkbox"/> RV102/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV104/VRA-1</p> <p>CH-A: <input checked="" type="checkbox"/> RV105/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV106/VRA-1</p>

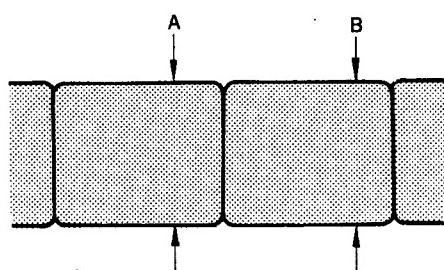
### 11-6-6. C REC Amp Secondary Distortion Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Remove CN4 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: flat field signal</li> <li>Connect the locally special made extension harness between the CN4 and harness.</li> <li>Connect the current probe to the pin 3 or pin 6 of the extension harness.</li> </ul>	<p>CH-A: Pin 3 of CN4/VRA-1 CH-B: Pin 6 of CN4/VRA-1</p> <p></p> <p>A=70±10mA<sub>p-p</sub></p> <p>TRIG: TP408/MDM-3P(F-1)</p>	<p>CH-A: <input checked="" type="checkbox"/> RV202/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV204/VRA-1</p>
<ul style="list-style-type: none"> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> </ul>	<p>spectrum analyzer</p> <p></p> <p>reference      secondary      higher harmonic</p> <p>Minimize the secondary higher harmonic level. (B≥40 dB)</p>	<p>CH-A: <input checked="" type="checkbox"/> RV205/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV206/VRA-1</p>

### 11-6-7. Y REC Current Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<p>Step 1.</p> <ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA Y IN: flat field 1 signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> </ul>	<p>TP301/MDM-3P(F-3)</p>  <p>Maximize the amplitude A and B.</p> <p>TRIG: TP308/MDM-3P(F-3)</p>	<p>CH-A: ● RV102/VRA-1</p> <p>CH-B: ● RV104/VRA-1</p>
<p>Step 2.</p> <ul style="list-style-type: none"> <li>Play back the self recorded portion on the BCT-20M cassette tape.</li> <li>Maximize the RF level with the TRACKING control VR.</li> </ul>	<p>Check: <math>A=B=0.5 \pm 0.1</math> V (The voltage difference between CH-A and CH-B should be within 0.1V)</p> <p>TRIG: TP308/MDM-3P(F-3)</p>	
<p>Step 3.</p> <ul style="list-style-type: none"> <li>Remove CN3 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA Y IN: flat field 1 signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> <li>Connect the locally special made extension harness between the CN3 and harness.</li> <li>Connect the current probe to the pin 3 or pin 6 of the extension harness.</li> <li>After the adjustment, mount CN3 on the VRA-1 Board.</li> </ul>	<p>CH-A: Pin 3 of CN3/VRA-1 CH-B: Pin 6 of CN3/VRA-1</p>  <p><math>A=60 \pm 10</math> mApp</p> <p>Check the recording current value at the current probe on pin 3 and pin 6 of CN3.</p>	

### **11-6-8. Y REC Current Adjustment (OXIDE)**

### 11-6-9. C REC Current Adjustment (METAL)

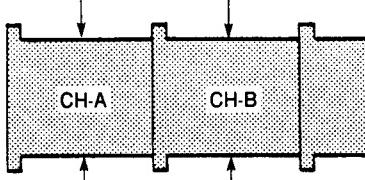
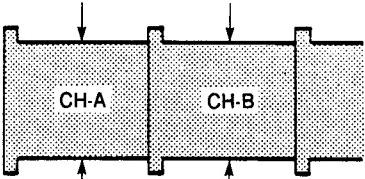
Machine conditions for adjustment	Specifications	Adjustments
<p>Step 1.</p> <ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA C IN: flat field 3</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• REC mode</li> </ul>	<p>TP401/MDM-3P(D-3) A B</p> <p>Maximize the amplitude of A and B. TRIG: TP408/MDM-3P(F-1)</p>	<p>CH-A: ② RV202/VRA-1</p> <p>CH-B: ② RV204/VRA-1</p>
<p>Step 2.</p> <ul style="list-style-type: none"> <li>• Remove CN4 on the VRA-1 Board.</li> <li>• Connect the locally special made extension harness between the CN4 and harness.</li> <li>• Connect the current probe to the pin 3 or pin 6 of the extension harness.</li> <li>• Measure the recording current value on pin 3 of CN4/VRA-1 (CA) and pin 6 of CN4/VRA-1 (CB).</li> </ul>	<p>Adjust the recording current CA=20 mA CB=20 mA</p>	
<p>Step 3.</p> <ul style="list-style-type: none"> <li>• Play back the self recorded portion on the BCT-20M cassette tape.</li> <li>• Maximize the RF level with the TRACKING control VR.</li> </ul>	<p>Check: A=B=0.55±0.1 Vp-p (The voltage difference between CH-A and CH-B should be within 0.1V)</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	
<p>Step 4.</p> <ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA Y IN: flat field 3</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• REC mode</li> <li>• After the adjustment, mount CN4 on the VRA-1 Board.</li> </ul>	<p>CH-A: Pin 3 of CN4/VRA-1 CH-B: Pin 6 of CN4/VRA-1</p> <p>A=50±7 mApp-p</p> <p>Check the recording current value at the current probe on pin 3 and pin 6 of CN4.</p>	

### 11-6-10. C REC Current Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<p>Step 1.</p> <ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA C IN: flat field 3</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> </ul>	<p>TP401/MDM-3P(D-3)</p> <p>A                              B</p> <p>Maximize the amplitude of A and B.</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	<p>CH-A: ● RV201/VRA-1</p> <p>CH-B: ● RV203/VRA-1</p>
<p>Step 2.</p> <ul style="list-style-type: none"> <li>• Play back the self recorded portion on the BCT-20K cassette tape.</li> <li>• Minimize the RF level with the TRACKING control VR.</li> </ul>	<p>Check: <math>A=B=0.65 \pm 0.1</math> Vp-p (The voltage difference between CH-A and CH-B should be within 0.1V)</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	
<p>Step 3.</p> <ul style="list-style-type: none"> <li>• Remove CN4 on the VRA-1</li> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA C IN: flat field 3</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> <li>• Connect the locally special made extension harness between the CN4 and harness.</li> <li>• Connect the current probe to the pin 3 or pin 6 of the extension harness.</li> <li>• After the adjustment, mount CN4 on the VRA-1 Board.</li> </ul>	<p>CH-A: Pin 3 of CN4/VRA-1 CH-B: Pin 6 of CN4/VRA-1</p> <p>A</p> <p><math>A = 34 \pm 10</math> mA p-p</p> <p>Check the recording current value at the current probe on pin 3 and pin 6 of CN4.</p>	

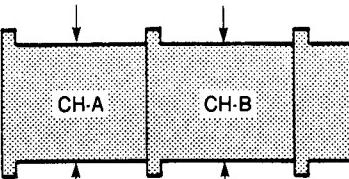
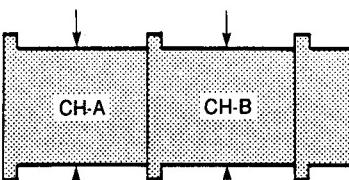
### 11-6-11. Overall Y/C RF Balance/Level Adjustment

#### Step 1. Y/C RF BALANCE/LEVEL CHECK (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: flat field 3</li> <li>• Insert a BCT-20M cassette tape, and put the unit into the self REC/PB mode.</li> <li>• TRACKING: Maximize the RF level</li> </ul>	<p>[Y RF balance/level] TP301/MDM-3P(F-3)</p>  <p>Spec 1. <math>CH-A = CH-B = 0.50 \pm 0.1 V</math>        Spec 2. The voltage difference between CH-A and CH-B should be within 0.05 V.</p> <p>TRIG: TP308/MDM-3P(F-3)</p>	
	<p>[C RF balance/level] TP401/MDM-3P(D-3)</p>  <p>Spec 1. <math>CH-A = CH-B = 0.5 \pm 0.1 V</math>        Spec 2. The voltage difference between CH-A and CH-B should be within 0.05 V.</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	

\* 1. When the specification in the Step 1. is not satisfied, perform section 11-6-7 and 11-6-9 within the specification.

Step 2. Y/C RF BALANCE/LEVEL CHECK (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: flat field 3</li> <li>Insert a BCT-20K cassette tape, and put the unit into the self REC/PB mode.</li> <li>TRACKING: Maximize the RF level</li> </ul>	<p>[Y RF balance/level] TP301/MDM-3P(F-3)</p>  <p>Spec 1. <math>CH-A = CH-B = 0.5 \pm 0.1 V</math>      Spec 2. The voltage difference between CH-A and CH-B should be within 0.1V</p> <p>TRIG: TP308/MDM-3P(F-3)</p>	
	<p>[C RF balance/level] TP401/MDM-3P(D-3)</p>  <p>Spec 1. <math>CH-A = CH-B = 0.5 \pm 0.1 V</math>      Spec 2. The voltage difference between CH-A and CH-B should be within 0.1 V.</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	

\* 2. When the specification in Step 2. is not satisfied, perform section 11-6-8 and 11-6-10 within the specification.

### 11-6-12. Overall Y Frequency Response Check

Machine conditions for adjustment	Specifications	Adjustments																										
<ul style="list-style-type: none"> <li>Set the S1 on the ENC-11P Board (C-1) to the ON position.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: multi-burst signal</li> <li>Insert a BCT-20M cassette tape, and put the unit into the self-REC/PB mode.</li> <li>After the adjustment, insert a BCT-20K cassette tape, and put the unit into the self-REC/PB mode.</li> </ul>	<p>TP132/ENC-11P (H-2)</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.5MHz</td> <td>100% Reference</td> </tr> <tr> <td>1 MHz</td> <td>100±5%</td> </tr> <tr> <td>2 MHz</td> <td>100±5%</td> </tr> <tr> <td>4 MHz</td> <td>100±5%</td> </tr> <tr> <td>5 MHz</td> <td>100±5%</td> </tr> <tr> <td>5.5MHz</td> <td>90±5%</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.5MHz</td> <td>100%Reference</td> </tr> <tr> <td>1 MHz</td> <td>100±5%</td> </tr> <tr> <td>2 MHz</td> <td>100±5%</td> </tr> <tr> <td>3 MHz</td> <td>85±10%</td> </tr> <tr> <td>4 MHz</td> <td>80±10%</td> </tr> </tbody> </table>	Frequency	Level	0.5MHz	100% Reference	1 MHz	100±5%	2 MHz	100±5%	4 MHz	100±5%	5 MHz	100±5%	5.5MHz	90±5%	Frequency	Level	0.5MHz	100%Reference	1 MHz	100±5%	2 MHz	100±5%	3 MHz	85±10%	4 MHz	80±10%	
Frequency	Level																											
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1 MHz	100±5%																											
2 MHz	100±5%																											
3 MHz	85±10%																											
4 MHz	80±10%																											

- When the specification is not satisfied, perform 11-6-14. Overall Y/C Frequency Response Adjustment.

### 11-6-13. Overall C Frequency Response Check

Machine conditions for adjustment	Specifications	Adjustments																				
<ul style="list-style-type: none"> <li>Set S1 on the ENC-11P Board (C-1) to the ON position.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: multi-burst signal</li> <li>Insert a BCT-20M cassette tape, and put the unit into the self-REC/PB mode.</li> <li>After the adjustment, insert a BCT-20K cassette tape and put the unit into the self-REC/PB mode.</li> </ul>	<p>TP2/CEC-3P(F-2)</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.2MHz</td> <td>100% Reference</td> </tr> <tr> <td>0.5MHz</td> <td>100±5%</td> </tr> <tr> <td>1 MHz</td> <td>100±10%</td> </tr> <tr> <td>1.5MHz</td> <td>90±10%</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.2MHz</td> <td>100%Reference</td> </tr> <tr> <td>0.5MHz</td> <td>100±5%</td> </tr> <tr> <td>1 MHz</td> <td>95±10%</td> </tr> <tr> <td>1.5MHz</td> <td>90±10%</td> </tr> </tbody> </table>	Frequency	Level	0.2MHz	100% Reference	0.5MHz	100±5%	1 MHz	100±10%	1.5MHz	90±10%	Frequency	Level	0.2MHz	100%Reference	0.5MHz	100±5%	1 MHz	95±10%	1.5MHz	90±10%	
Frequency	Level																					
0.2MHz	100% Reference																					
0.5MHz	100±5%																					
1 MHz	100±10%																					
1.5MHz	90±10%																					
Frequency	Level																					
0.2MHz	100%Reference																					
0.5MHz	100±5%																					
1 MHz	95±10%																					
1.5MHz	90±10%																					

- When the specification is not satisfied, perform section 11-6-14. Overall Y/C Frequency Response Adjustment.

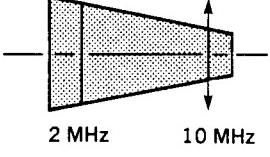
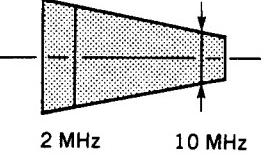
#### 11-6-14. Overall Y/C Frequency Response Adjustment

When performing this step, refer to the sections as follows.

11-6-1, 11-6-3. Y REC Current Frequency Response Adjustment (METAL)(OXIDE)

11-6-2, 11-6-4. C REC Current Frequency Response Adjustment (METAL)(OXIDE)

Perform adjustment for both Y and C.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>When Y frequency response adjustment</li> </ul> <p>This is same as section 11-6-1 and 11-6-3.</p>	<p>[When the high-frequency level is high in 11-6-12, 13.]</p> <ul style="list-style-type: none"> <li>Y adjustment CH-A : Pin 3 of CN3/VRA-1 CH-B : Pin 6 of CN3/VRA-1</li> <li>C adjustment CH-A : Pin 3 of CN4/VRA-1 CH-B : Pin 6 of CN4/VRA-1</li> </ul>  <p>Raise the 10 MHz level.</p>	<ul style="list-style-type: none"> <li>Y adjustment (METAL) CH-A : <input checked="" type="checkbox"/> RV107/VRA-1 CH-B : <input checked="" type="checkbox"/> RV109/VRA-1</li> <li>Y adjustment (OXIDE) CH-A : <input checked="" type="checkbox"/> RV108/VRA-1 CH-B : <input checked="" type="checkbox"/> RV110/VRA-1</li> <li>C adjustment (METAL) CH-A : <input checked="" type="checkbox"/> RV207/VRA-1 CH-B : <input checked="" type="checkbox"/> RV209/VRA-1</li> <li>C adjustment (OXIDE) CH-A : <input checked="" type="checkbox"/> RV208/VRA-1 CH-B : <input checked="" type="checkbox"/> RV210/VRA-1</li> </ul>
	<p>[When the high-frequency level is low in 11-6-12, 13.]</p> <ul style="list-style-type: none"> <li>Y adjustment CH-A : Pin 3 of CN3/VRA-1 CH-B : Pin 6 of CN3/VRA-1</li> <li>C adjustment CH-A : Pin 3 of CN4/VRA-1 CH-B : Pin 6 of CN4/VRA-1</li> </ul>  <p>Lower the 10 MHz level.</p>	

After the adjustment, perform check item in the following adjustment.

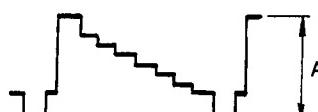
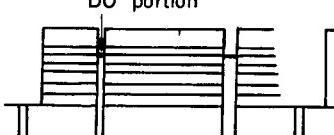
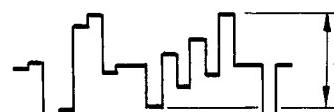
11-6-7. Y REC Current Adjustment (METAL)

11-6-8. Y REC Current Adjustment (OXIDE)

11-6-9. C REC Current Adjustment (METAL)

11-6-10. C REC Current Adjustment (OXIDE)

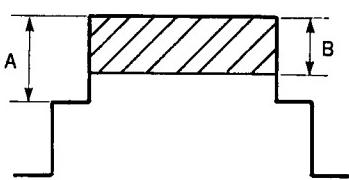
### 11-6-15. CONFI Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect pin 14 of CN1 on the MDM-3P Board (D-4) to GND with a shorting clip.</li> <li>CONFI SW: Y</li> <li>Play back the color bar (DO) signal on the alignment tape CR5-1B PS.</li> </ul>	<p>Step 1. VIDEO OUT Connector (terminated at 75ohms)</p>  <p><math>A = 1.0 \pm 0.1 V</math></p> <p>TRIG: TP308/MDM-3P(F-3)</p>	• RV1(IC505)/MDM-3P(E-1)
<ul style="list-style-type: none"> <li>CNFI SW: C</li> <li>After the adjustment, remove the shorting clips.</li> <li>Set the CONFI SW to OFF.</li> </ul>	<p>Step 2. VIDEO OUT connector (terminated at 75 ohms)</p> <p>DO portion</p>  <p>Coincide DO portion with the 3rd step.</p> <p>* Repeat Step 1. and 2 until the value satisfy the specification.</p> <p>TRIG: TP308/MDM-3(F-3)</p>	• RV2(IC505)/MDM-3P(E-1)
	<p>Step 3. VIDEO OUT Connector (terminated at 75ohms)</p>  <p><math>A = 0.5 \pm 0.1V</math></p>	

## 11-7. VIDEO OVERALL PHASE ADJUSTMENT

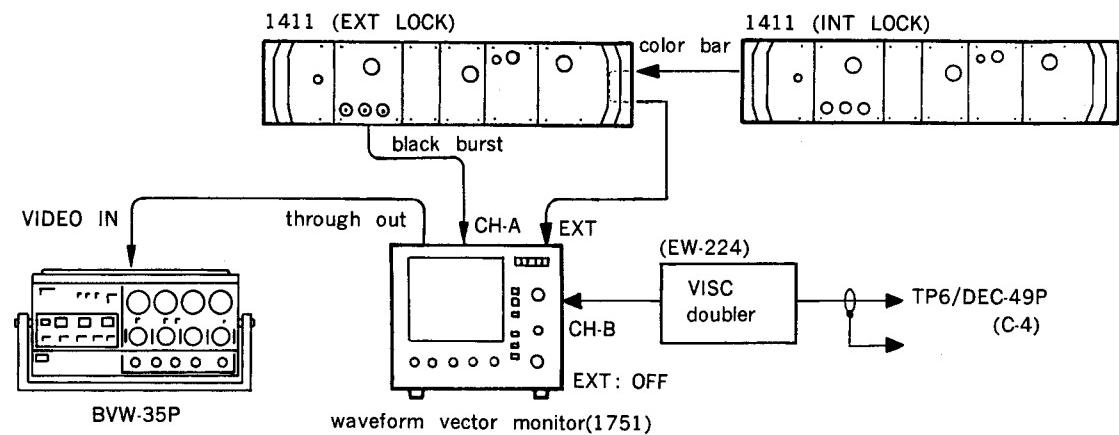
### 11-7-1. VISC Adjustment

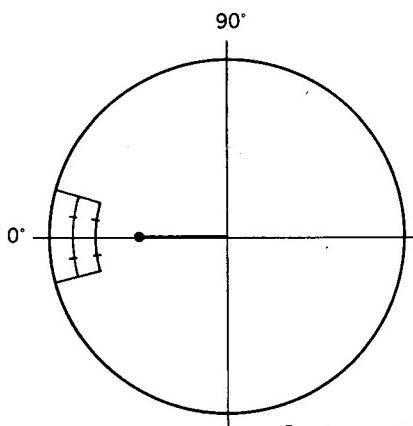
Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Turn RV507 on the DEC-49P Board (E-2) fully clockwise direction.</li> <li>Set RV508 on the DEC-49P Board (E-2) to the mechanical center position.</li> <li>VIDEO IN: black burst signal</li> <li>EE mode</li> <li>waveform vector monitor: WFM mode (line selector 8 line)</li> </ul>	TP9/DEC-30(C-4)  <p>Spec 1 : A = 0.35±0.01V Spec 2 : B = 0.3±0.01V</p>	Spec 1. <input checked="" type="checkbox"/> RV509/DEC-49P(E-2) Spec 2. <input checked="" type="checkbox"/> RV507/DEC-49P(E-2)

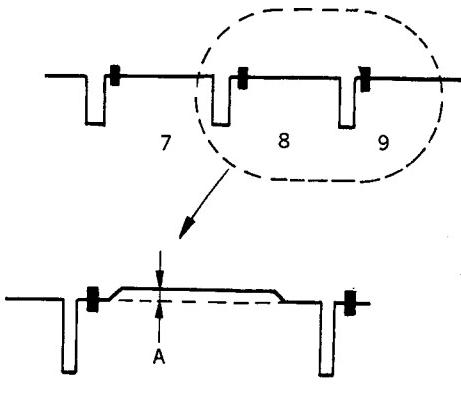
Step 2.

[Connection]



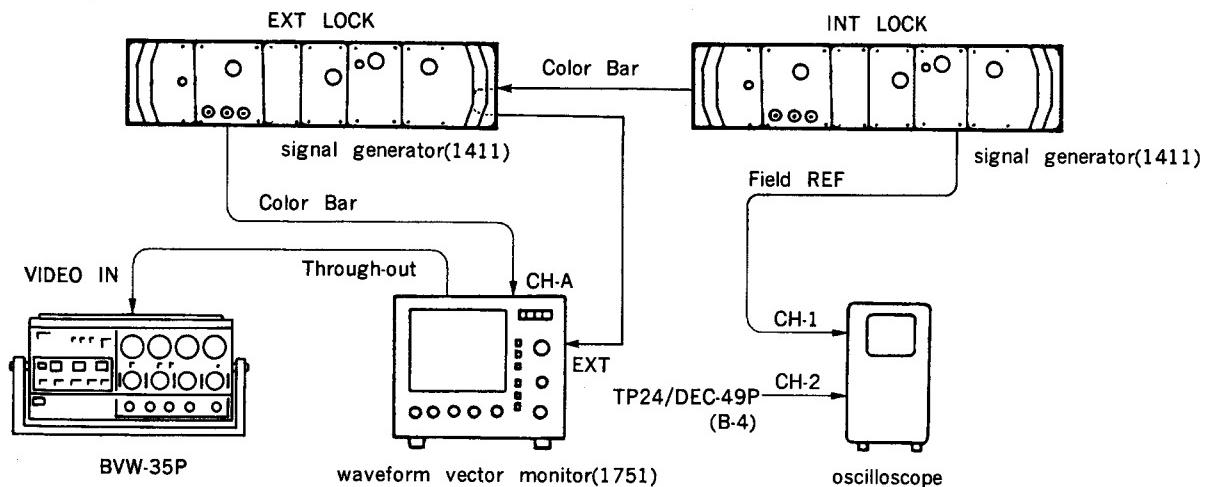
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: black burst signal</li> <li>EE mode</li> <li>Set SCH phase to zero degree with the SC PHASE control knob on the signal generator.</li> </ul>	waveform vector monitor 	RV508/DEC-49P(E-2)

### 11-7-2. VISC Mute Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> <li>waveform monitor: WFM mode (line selector 8 line)</li> </ul>	VIDEO OUT connector (terminated at 75ohms) 	RV401/ENC-11P(E-1)

### 11-7-3. CF ID Pulse Adjustment

[Connection]



Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO Level: center clicked position</li> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> <li>Set the SCH phase to the 0-degree position with the SC PHASE control knob on the EXT LOCK 1411.</li> </ul>	<p>Waveform vector monitor</p> <p>[SCH mode]</p>	SC PHASE control knob on the signal generator

Step 2.

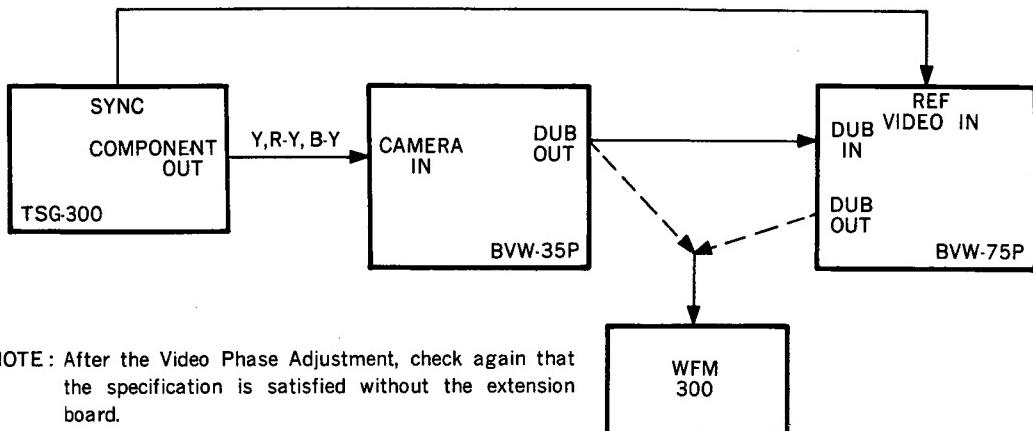
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Connect TP19 on the DEC-49P Board (A-2) to GND with a shorting clip.</li> <li>• Turn temporarily RV610 on the DEC-49P Board (A-2) fully clockwise direction.</li> <li>• VIDEO level: Center clicked position</li> <li>• VIDEO IN: color bar signal</li> <li>• EE mode</li> <li>• Adjust the field signal with an oscilloscope.</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	<p>Field REF</p> <p>TP24/DEC-49P(B-4)</p> <p>OK:</p> <p>NG:</p> <p>TRIG: SG Field REF</p>	• RV610/DEC-49P(A-2)

Step 3.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Turn the SC PHASE control knob on the signal generator, and shift the phase by <math>\pm 80</math> degrees.</li> <li>• Check the specification in Step 2.</li> <li>• VIDEO level: Center clicked position</li> <li>• VIDEO IN: color bar signal</li> <li>• EE mode</li> </ul>	<p>Waveform vector monitor</p> <p>When the specification in Step 2. is not satisfied, readjust from Step 2.</p>	SH PHASE control knob on the signal generator

#### 11-7-4. Video Phase Adjustment

[Connection]



##### Step 1. BVW-75P Check

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the bowtie &amp; 10T signal on the alignment tape CR5-1B PS with a BVW-75P.</li> </ul>	DUB OUT connector/BVW-75P <p>B-Y                                    R-Y</p> <p>C/C delay <math>0 \pm 5</math> nsec  Y/C delay <math>0 \pm 5</math> nsec</p>	* When out of specification. C/C delay <input checked="" type="checkbox"/> RV501/TBC-8P(F-1) : BVW-75P  Y/C delay <input checked="" type="checkbox"/> Y/C DELAY/sub panel : BVW-75P

##### Step 2. DUB OUT Y/C Delay Adjustment (EE mode)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: BOWTIE(50%)</li> <li>EE mode</li> </ul>	DUB OUT connector/WFM-300 <p>B-Y                                    R-Y</p> <p>Y/C delay <math>0 \pm 20</math> nsec</p>	<input checked="" type="checkbox"/> RV139/ENC-11P (G-2)

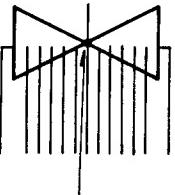
### 11-7-5. PB C/C, Y/C Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• Play back the bowtie & 10T signal on the alignment tape CR5-1B PS.	<p>DUB OUT connector/WFM-300</p> <p>C/C delay</p> <p>B-Y                                    R-Y</p> <p>Equalize amount of delay</p> <p><math>0 \pm 10 \text{ nsec}</math></p>	• RV1/EQ-23 [A160] : CEC-3P(E-2)
	<p>Y/C delay</p> <p>B-Y                                    R-Y</p> <p><math>0 \pm 10 \text{ nsec}</math></p>	• RV501/ENC-11P(C-1)

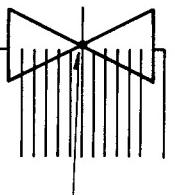
### 11-7-6. PB Y/C Delay Adjustment (Composite)

Machine conditions for adjustment	Specifications	Adjustments
• Play back the Y/C delay portion on the alignment tape CR5-2A PS.	<p>VIDEO OUT connector</p> <p>OK                                    OK</p> <p>NG                                    NG</p> <p>Y delay                              Y advance</p>	• RV507/CEC-3P(B-3)

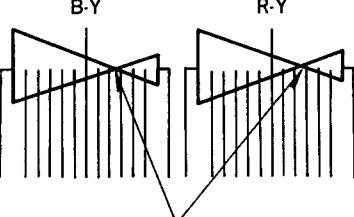
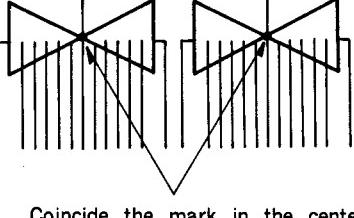
### 11-7-7. Video Phase Adjustment (1)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the bowtie &amp; 10T signal on the alignment tape CR5-1B PS with a BVW-75P.</li> <li>CAPSTAN LOCK SW/sub panel (BVW-75P): 2FD</li> </ul>	<p>DUB OUT connector/BVW-75P: WFM-300</p>  <p>Coincide the mark in the center with center of the bowtie.</p> <p><math>0 \pm 5 \text{ nsec}</math></p>	<input checked="" type="checkbox"/> SYNC FINE/sub panel : BVW-75P

### 11-7-8. Video Phase Adjustment (2)

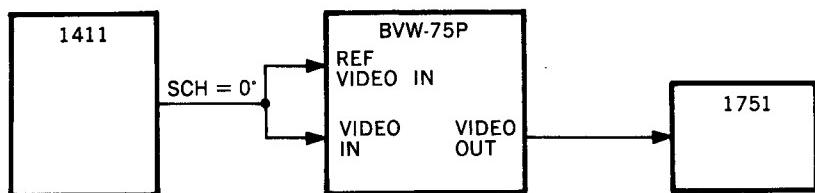
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: bowtie signal (50 %)</li> <li>Connect the DUB OUT connector on the BVW-35P to the DUB IN connector on the BVW-75P</li> <li>Insert a BCT-20M (in the Metal mode adjustment)/ BCT-20K (in the Oxide mode adjustment) cassette tape.</li> <li>INPUT SELECT SW/BVW-75P: CTDM</li> <li>EE mode (Both BVW-35P, and BVW-75P)</li> </ul>	<p>DUB OUT connector/BVW-75P: WFM-300</p>  <p>Coincide the mark in the center with center of the bowtie.</p> <p><math>0 \pm 5 \text{ nsec}</math></p>	Metal <input checked="" type="checkbox"/> RV615/TG-31: MDM-3P(B-2) Oxide <input checked="" type="checkbox"/> RV616/TG-31: MDM-3P(B-2)

### 11-7-9. Overall C/C, Y/C Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: bowtie signal (50 %)</li> <li>Connect the DUB OUT connector on the BVW-35P to the DUB IN connector on the BVW-75P.</li> <li>Insert a BCT-20M (in the Metal mode adjustment)/BCT-20K (in the Oxide mode adjustment).</li> <li>INPUT SELECT SW/BVV-75P: CTDM</li> <li>EE mode (Both BVW-35P and BVW-75P)</li> </ul>	 <p>Equalize amount of the delay</p> <p><math>0 \pm 20 \text{ nsec}</math></p>  <p>Coincide the mark in the center with center of the bowtie.</p> <p><math>0 \pm 20 \text{ nsec}</math></p>	<p>Metal</p> <p>• RV1/EQ-23 [A109] : CEC-3P(F-2)</p>
Step. 2	<p>DUB OUT connector/BVV-35P: WFM-300</p> <p>Check that the specification in step 1 is satisfied. When the specification is not satisfied, readjust in step 1 within the specified level.</p>	
Step. 3	<p>DUB OUT connector/BVV-75P: WFM-300</p> <p>Check that the specification in step 1 is satisfied. When the specification is not satisfied, readjust in step 1 within the specified level.</p>	

### 11-7-10. VISC Check (1)

[Connection]



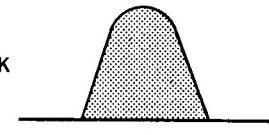
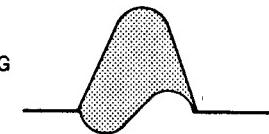
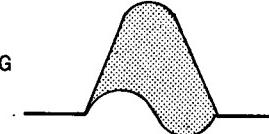
BVW-75 VISC Check and adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN/BVV-75P: color bar signal</li> <li>INPUT SELECT SW/BVV-75P: COMPOSITE</li> <li>CAPSTAN LOCK SW/BVV-75P: 2FD/(4FD) (sub panel)</li> <li>S500-4/TBC-8 (H-1) BVW-75P: ON</li> <li>After the adjustment, set S500-4 to the OFF position.</li> </ul>	<p>VIDEO OUT connector/BVV-75P</p> <p>Set SCH to zero degree</p> <p>* 1751 LINE SELECT=8LINE</p>	<ul style="list-style-type: none"> <li>SC/sub panel: BVW-75P</li> </ul>
	<p>VIDEO OUT connector/BVV-75P</p> <p>Coincide the burst with the VISC phase.</p> <p>* 1751: VECTOR mode</p>	<ul style="list-style-type: none"> <li>RV510/CF-28: DEC-20 (E-8): BVW-75P</li> <li>CAPSTAN LOCK=8 FD</li> <li>RV701/EN-48(I-2) : BVW-75P</li> </ul>

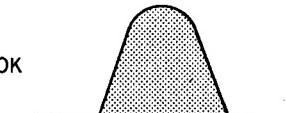
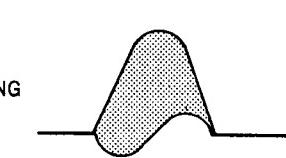
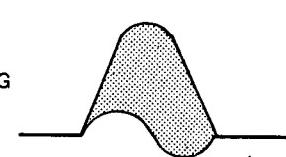
### 11-7-11. VISC Check (2)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO IN: Pulse/Bar composite signal</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• REC mode</li> <li>• Play back the recorded portion with a BVW-75P</li> <li>• CAPSTAN LOCK/BVW-75P: 8 FD</li> </ul>	<p>VIDEO OUT connector/BVW-75P</p> <p>(<math>0 \pm 20</math> nsec)</p> <p>* When the specification is not satisfied, perform section 11-7-1 again.</p>	

### 11-7-12. Overall Y/C Delay Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: pulse/bar signal</li> <li>Insert a BCT-20M cassette tape, and put the unit into the self-REC/PB mode.</li> </ul>	<p>VIDEO OUT connector (terminated at 75ohms)</p>   <p>Turn RV617 slightly counterclockwise direction.</p>  <p>Turn RV617 slightly clockwise direction.</p>	<p>• RV617/TG-31[A102](B-2)</p>
<ul style="list-style-type: none"> <li>Waveform monitor: LINE SELECTOR OFF</li> <li>Waveform monitor: LINE SELECTOR 15 LINE Field: 1+3, 2+4</li> </ul>	<p>Spec 1. <math>0 \pm 20</math> nsec</p> <p>Spec 2. Difference between fields <math>0 \pm 30</math> nsec CH-A: 1+3, CH-B: 2+4</p>	

### 11-7-13. Overall Y/C Delay Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: pulse/bar signal</li> <li>Insert a BCT-20K cassette tape, and put the unit into the self REC/PB mode.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p>  <p>OK</p>  <p>NG</p> <p>chroma advance</p> <p>Turn RV618 slightly counterclockwise direction.</p>  <p>NG</p> <p>chroma delay</p> <p>Turn RV618 slightly clockwise direction.</p>	RV618/TG-31[A102](B-2)
<ul style="list-style-type: none"> <li>Waverform monitor: LINE SELECTOR OFF</li> </ul>	<p>Spec 1.</p> <p><math>0 \pm 20</math> nsec</p>	
<ul style="list-style-type: none"> <li>Waveform monitor: LINE SELECTOR 15 LINE Field: 1+3, 2+4</li> </ul>	<p>Spec 2. Difference between fields</p> <p><math>0 \pm 30</math> nsec</p> <p>CH-A: 1+3, CH-B: 2+4</p>	



**SONY®**

PORTABLE VIDEOCASSETTE RECORDER  
**BVW-35P**

**SUPPLEMENT-4**

Applicable Serial No. : 10425 through 10769

Applicable Manual : 2nd Edition.

**CONTENTS : Section 8. POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT**

**Section 9. SERVO SYSTEM ALIGNMENT**

**Section 10. AUDIO SYSTEM ALIGNMENT**

**Section 11. VIDEO SYSTEM ALIGNMENT**

Please file this **SUPPLEMENT-4** to your own manual, and replace  
the **TABLE OF CONTENTS** with attached ones.

**BETACAM SP™**

MAINTENANCE MANUAL

Volume 1

EBU N-10 LEVEL

BVW-35P (EK)  
9-967-120-04

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1988.8 04

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## Volume-2

### 12. BLOCK DIAGRAMS

### 13. SEMICONDUCTOR ELECTRODES

### 14. SCHEMATIC DIAGRAMS

### 15. PRINTED WIRING BOARDS

### 16. SPARE PARTS AND FIXTURE

## SECTION 8

### POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

#### [Equipment Required]

- Oscilloscope
- Blank tape (BCT-20K or the equivalent)
- Variable voltage power supply
- DC voltmeter
- PAL signal generator (TEKTRONIX 1411 or equivalent)

#### 8-1. POWER SUPPLY CHECK

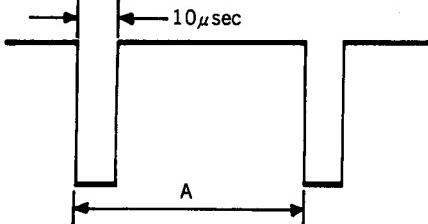
Be sure to perform the following check when repairing or replacing a DC-DC converter.

##### 8-1-1. DC-DC Converter Voltage Check

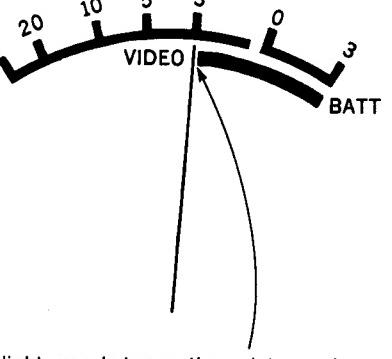
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• EE mode</li> <li>• DC voltmeter</li> </ul>	TP1/MB-157(G-1) +12.0±0.2 V TP2/MB-157(D-2) +9.2±0.2 V TP3/MB-157(B-5) +5.1±0.2 V TP4/MB-157(B-4) -5.15±0.2 V TP5/MB-157(G-1) -12.05±0.2 V	

#### 8-2. SYSTEM CONTROL ALIGNMENT

##### 8-2-1. Battery Before/End Voltage Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• SAVE, PB/EE, PB select sw: SAVE (on the connector panel)</li> <li>• Turn RV1 on the SY-110 Board (J-1) fully clockwise direction.</li> <li>• EXT DC IN: 10.540±0.005 V (from variable voltage power supply)</li> <li>• POWER SW: ON</li> </ul>	TP21/SY-110(C-1)  A ≈ 16 msec	<span style="color: blue;">●</span> RV1/SY-110(J-1) Turn RV1 counter-clockwise direction little by little, and adjust to the point that the negative pulse is generated.

### 8-2-2. Battery Meter Calibration Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO IN: color bar signal</li> <li>• Supply <math>11.00 \pm 0.01</math> Vdc voltage to the battery terminal.</li> <li>• Insert a BCT-20 K cassette tape.</li> <li>• REC mode</li> <li>• Put the unit vertically.</li> <li>• Meter select sw: BATT</li> </ul>	<p>AUDIO CH-2/TRACK/BATT meter</p>  <p>Make a slight gap between the pointer and green belt. (within a pointer width)</p>	• RV13/MT-34 (F-1)

## SECTION 9

### SERVO SYSTEM ALIGNMENT

**[Equipment Required]**

- Square-wave oscillator
- DC voltmeter
- Dual-trace oscilloscope
- Frequency counter
- Monitor
- Shorting clip
- PB amplifier jig (J-6331-120-A)
- Blank tape (BCT-20K)
- Alignment tape CR2-1BPS (8-960-096-51)

**Contents**

VIDEO TRACK	AUDIO TRACK	TIME CODE TRACK	CTL TRACK
Y : 6 MHz signal C : 5 MHz signal	Blank	CTL	CTL

- Alignment tape CR5-1APS (8-960-098-37)

**Contents**

TIME min. sec	VIDEO TRACK	AUDIO TRACK	TIME CODE TRACK	CTL TRACK
0: 00	Color Bars			
4: 55	Blank	Blank		
5: 00	Gated Sweep			
8: 55	Blank	1 kHz/0 dB		
9: 00				
10: 55	Y/C Delay			
11: 00	Blank	10 kHz/-10 dB		
12: 55	2T Pulse & Bar			
13: 00	Blank	1 kHz (reference)		
14: 55	C-Linearity		40 7k 10k 15k	
15: 00	Blank			
16: 55	C-Monoscope (Switching position is shifted.)	Blank		
18: 55	Blank	Blank	Blank	800 Hz sin wave

**[VIDEO IN]**

- When performing the servo system alignment, supply standard video signal to the VIDEO IN.

## 9-1. FF/REW SPEED TENTATIVE ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Press the cassette-in switch without inserting a cassette tape and put the unit into the THREADING mode.</li> <li>• Place the unit prependicular to the floor.</li> <li>• REW mode</li> <li>• DC voltmeter</li> </ul>	TP6/SD-16P (E-1)  7.0±0.1 Vdc	● RV23/SV-94P (K-2)

## 9-2. FF REEL SEND CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode.</li> <li>• Place the unit prependicular to the floor.</li> <li>• Connect TP33 on the SV-94P Board (K-3) to GND with a shorting clip.</li> <li>• Supply 800 Hz, 5 Vp-o square-wave signal to TP34 on the SV-94P Board (K-3).</li> <li>• FF mode</li> <li>• DC voltmeter</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	Positive (+) side : TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (D-2)  45±2 mVdc	● RV31/SV-94P (L-3)

### 9-3. REW REEL SEND CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode.</li> <li>• Place the unit perpendicular to the floor.</li> <li>• Connect TP31 on the SV-94P Board (K-3) to GND with a shorting clip.</li> <li>• Supply 800 Hz, 5 Vp-o square-wave signal to TP32 on the SV-94P Board (K-3).</li> <li>• REW mode</li> <li>• DC voltmeter</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	Positive (+) side : TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)  $68 \pm 2$ mVdc	● RV28/SV-94P (K-3)

### 9-4. X1/30 TOP REW ADJUSTMENT (AT THE TAKE-UP REEL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Set the pre-recorded BCT-20K cassette tape to its beginning portion, and then insert it.</li> <li>• Put the unit into the REW-SEARCH mode. Three seconds later, connect TP50 on the SV-94P Board (F-2) to GND with a shorting clip. Then, put the unit into the REW-SEARCH STILL mode.</li> <li>• DC voltmeter</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	Positive (+) side : TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)  $66 \pm 2$ mVdc  <Reference> When REW-SEARCH mode: $66 \pm 5$ mVdc	● RV29/SV-94P (L-3)

## 9-5. ×1/30 TOP FF ADJUSTMENT (AT THE TAKE-UP REEL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the pre-recorded BCT-20K cassette tape to its beginning, and then insert it.</li> <li>Put the unit into the FF-SEARCH mode. Three seconds later, connect TP50 on the SV-94P Board (F-2) to GND with a shorting clip. Then, put the unit into the FF-SEARCH STILL mode.</li> <li>DC voltmeter</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	Positive (+) side : TP8/SD-16P (G-2) Negative (-) side: TP5/SD-16P (D-2)  $264 \pm 2$ mVdc  <Reference> When FF-SEARCH mode: $264 \pm 10$ mVdc	• RV30/SV-94P (L-3)

## 9-6. ×1/30 TOP FF ADJUSTMENT (AT THE SUPPLY REEL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it.</li> <li>Put the unit into the FF-SEARCH mode. Three seconds later, connect TP50 on the SV-94P Board (F-2) to GND with a shorting clip. Then, put the unit into the FF-SEARCH STILL mode.</li> <li>DC voltmeter</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	Positive (+) side : TP9/SD-16P (G-2) Negative (-) side: TP10/SD-16P (F-1)  $286 \pm 2$ mVdc  <Reference> When FF-SEARCH mode: $110 \pm 5$ mVdc	• RV33/SV-94P (L-2)

### 9-7. $\times 1/30$ TOP REW ADJUSTMENT (AT THE SUPPLY REEL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it.</li> <li>• Put the unit into the REW-SEARCH mode. Three seconds later, connect TP50 on the SV-94P Board (F-2) to GND with a shorting clip. Then, put the unit into the REW-SEARCH STILL mode.</li> <li>• DC voltmeter</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	<p>Positive (+) side : TP9/SD-16P (G-2)      Negative (-) side: TP10/SD-16P (F-1)</p> <p style="text-align: center;"><math>198 \pm 2</math> mVdc</p> <p>&lt;Reference&gt;</p> <p style="text-align: center;">When REW-SEARCH mode:  <math>285 \pm 10</math> mVdc</p>	• RV34/SV-94P (L-2)

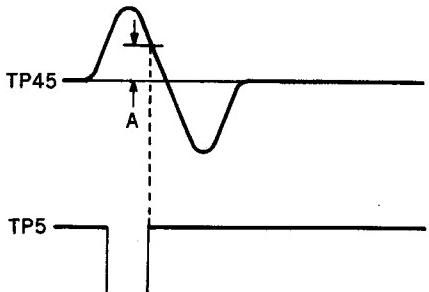
### 9-8. SEARCH $\times 3$ CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it.</li> <li>• REW-SEARCH mode</li> <li>• DC voltmeter</li> </ul>	<p>Positive (+) side : TP9/SD-16P (G-2)      Negative (-) side: TP10/SD-16P (F-1)</p> <p style="text-align: center;"><math>440 \pm 2</math> mVdc</p> <p>&lt;Reference&gt;</p> <p style="text-align: center;">When inserting a pre-recorded BCT-20K cassette tape which is set to its end portion:  <math>285 \pm 10</math> mVdc</p>	• RV32/SV-94P (L-3)

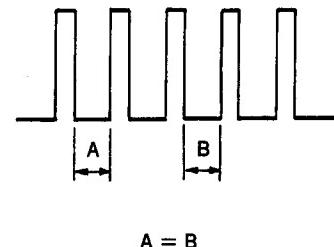
## 9-9. BACK TENSION ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the pre-recorded BCT-20K cassette tape to its beginning portion, and insert it.</li> <li>FF-SEARCH mode</li> <li>DC voltmeter</li> </ul>	<p>Positive (+) side : TP11/SD-16P (E-1)      Negative (-) side: TP12/SD-16P (E-1)</p> <p style="text-align: center;"><math>1080 \pm 10 \text{ mVdc}</math></p> <p>&lt;Reference&gt;      When inserting a pre-recorded BCT-20K cassette tape which is set to its end portion:</p> <p style="text-align: center;"><math>1080 \pm 50 \text{ mVdc}</math></p>	• RV35/SV-94P (L-2)

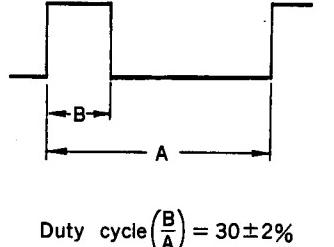
## 9-10. DRUM PG ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode.</li> <li>PLAY mode</li> </ul>	<p>CH-1: TP45/SV-94P (B-3)      CH-2: TP5/SV-94P (B-3)</p>  <p style="text-align: center;"><math>A = 25 \text{ mV} \pm 25 \text{ mV}</math></p> <p>&lt;Reference&gt;      When connecting TP16 on the SV-94P Board (F-3) to GND with a shorting clip:  <math>A = 25 \text{ mV} \pm 25 \text{ mV}</math></p>	• RV1/SV-94P (B-2)

### 9-11. CAPSTAN FG-B ADJUSTMENT

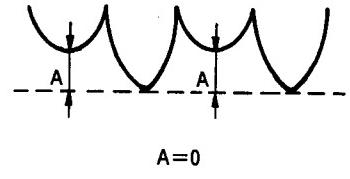
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Press the cassette-in switch without inserting a cassette tape, and put the unit into the THREADING mode.</li> <li>PLAY mode</li> </ul>	<p>CH-1: TP22/SV-94P (G-2)      CH-2: (TRIG): TP401/SV-94P (G-2)</p>  <p>A = B</p>	• RV15/SV-94P (G-2)

### 9-12. CAPSTAN FREE SPEED TENTATIVE ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Insert the alignment tape CR5-1A PS.</li> <li>PLAY mode</li> </ul>	<p>TP20/SV-94P (A-1)</p>  <p>Duty cycle <math>(\frac{B}{A}) = 30 \pm 2\%</math></p>	• RV21/SV-94P (B-1)

### 9-13. STOP SERVO ADJUSTMENT

#### Step 1

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect TP24 on the SV-94P (J-1) Board to TP26 on the SV-94P (K-1) with a shorting clip.</li> <li>Play back color bar signal on the alignment tape CR5-1A PS.</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	<p>TP28/SV-94P (J-1)</p>  <p>A=0</p>	• RV18/SV-94P (J-2)

## Step 2

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back color bar signal on the alignment tape CR5-1A PS.</li> </ul>	TP29/SV-94P (H-2)  Check $B \geq \frac{A}{2}$	

## Step 3

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect TP25 on the SV-94P (J-1) Board to TP27 on the SV-94P Board (K-2) with a shorting clip.</li> <li>Play back color bar signal on the alignment tape CR5-1A PS.</li> <li>PLAY•PAUSE mode</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	TP41/SV-94P (H-1) A = $0.6 \pm 0.05$ Vdc	<input checked="" type="checkbox"/> RV19/SV-94P (J-2)

## 9-14. TRACKING CENTER TENTATIVE ADJUSTMENT

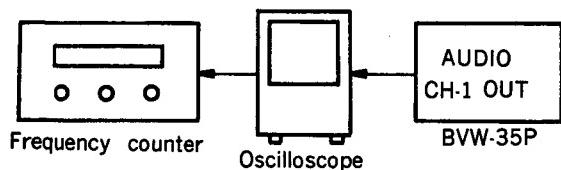
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set the TRACKING control volume to the center clicked position.</li> <li>Insert the alignment tape CR2-1B PS.</li> <li>PLAY mode</li> </ul>	<p>CH-1: TP17/SV-94P (G-1) CH-2: TP21/SV-94P (E-2)</p> <p style="text-align: center;"><math>A = 6.7 \pm 0.1 \text{ ms}</math></p>	<p>• RV14/SV-94P (F-2)</p> <p>• Adjust center of the jitter.</p>

## 9-15. 1/2VD PB CTL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect TP16 on the SV-94P Board (F-3) to GND with a shorting clip.</li> <li>Insert the alignment tape CR2-1B PS.</li> <li>PLAY mode</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	<p>CH-1: TP44/SV-94P (J-1) CH-2: TP21/SV-94P (E-2)</p> <p style="text-align: center;"><math>A = 0 \pm 100 \mu\text{sec}</math></p>	<p>• RV21/SV-94P (B-1)</p>

## 9-16. TAPE SPEED ADJUSTMENT

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect as follows with shorting clips: TP21/SY-110 (C-1) <math>\leftrightarrow</math> GND TP30/SV-94P (B-1) <math>\leftrightarrow</math> GND</li> <li>Insert the alignment tape CR5-1A PS.</li> <li>Play back from 5: 00 to 9: 00 on the alignment tape CR5-1A PS.</li> <li>After the adjustment, remove the shorting clips.</li> </ul>	<p>AUDIO OUT CH-1 connector</p> <p>tape speed=<math>1000 \pm 1</math> Hz</p>	<p>• RV20/SV-94P (B-2)</p> <p>• Adjust output level according to the correction value.</p>

## 9-17. FF/REW SPEED ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Insert the Alignment tape CR5-1A PS.</li> <li>REW mode (from 15: 00 to 5: 00 on the alignment tape CR5-1A PS).</li> </ul>	<p>TP17/SV-94P (G-1)</p> <p><math>2.66 \text{ msec} \pm 0.05 \text{ msec}</math></p>	<p>• RV23/SV-94P (K-2)</p>

## 9-18. DRUM LOCK PHASE/P<sup>2</sup> PHASE ADJUSTMENT

### Step 1

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Connect TP7/SV-94P (C4) to GND with a shorting clip.</li> <li>• VIDEO IN: color bar signal</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	<p>CH-1: TP42/SV-94P (B-3) CH-2: TP48/SV-94P (A-1)</p> <p>A=143±9.5μsec (2.25±0.15H)</p>	• RV7/SV-94P (E-2)

### Step 2

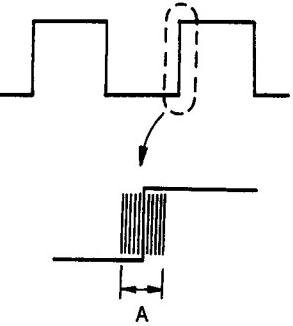
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO IN: color bar signal</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> </ul>	<p>CH-1: TP42/SV-94P (B-3) CH-2: TP48/SV-94P (A-1)</p> <p>A=value in step 1±6.3μsec (0.1H)</p>	• RV4/SV-94P (B-3)

## 9-19. DRUM AFC ADJUSTMENT

### Step 1

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>TBC SW: OFF</li> <li>Connect VIDEO OUT 1 to the monitor.</li> <li>Play back color bar signal on the alignment tape CR5-1A PS.</li> </ul>	TP12/SV-94P (E-1) $2.5 \pm 0.5$ Vdc TP11/SV-94P (E-1) voltage value in $TP12 \pm 0.5$ Vdc	

### Step 2

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set RV37 on the SV-94P Board (E-2) to the mechanical center position.</li> <li>Play back color bar signal on the alignment tape CR5-1A PS.</li> <li>STILL mode</li> </ul>	TP10/SV-94P (D-1)  Time difference A between PLAY and STILL modes $\leq 0.1 \mu\text{sec}$ * The monitor should be locked.	<input checked="" type="checkbox"/> RV10/SV-94P (F-1) • Adjust center of the jitter.

### Step 3

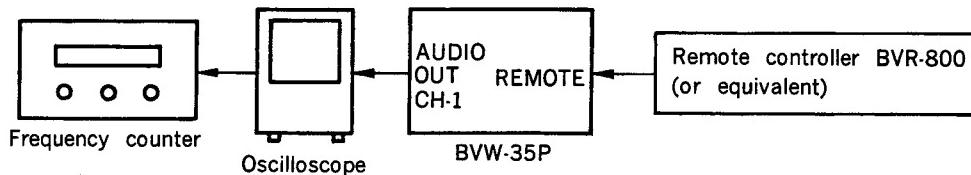
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back color bar signal on the alignment tape CR5-1A PS.</li> <li>REW-SEARCH mode</li> </ul>	CN11 (6 pin)/SV-94P (E-1) $1.85 \pm 0.02$ Vdc	<input checked="" type="checkbox"/> RV37/SV-94P (E-2)

**Step 4 Check**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back color bar signal on the alignment tape CR5-1A PS.</li> <li>PLAY mode and STILL mode</li> </ul>	TP13/SV-94P (E-1) Voltage difference between PLAY mode and STILL mode $\leq 0.3$ Vdc	

**9-20. SEARCH X1/30 ADJUSTMENT**

[Connection]



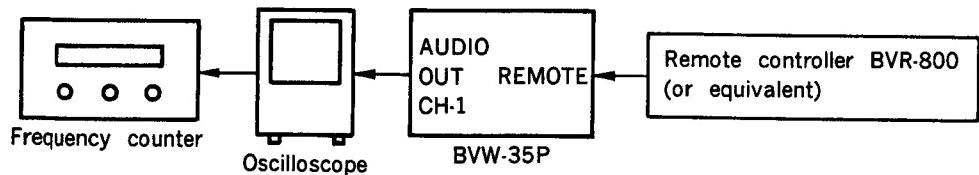
[Preparation]

- CH-1 AUDIO IN:  $3000 \pm 1$  Hz – 60 dBs
- Insert a BCT-20K cassette tape, and record above signal.  
\*Recording near the middle of the tape is also possible. (approximately five minutes)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Put the unit into the remote controller's FWD SEARCH <math>\times 1/30</math> mode near the middle of the tape.</li> <li>Set the (3 kHz) recorded BCT-20K cassette tape to near its middle portion.</li> <li>Remote controller BVR-800 (or the equivalent)</li> <li>Frequency counter</li> </ul>	AUDIO OUT CH-1 connector  100.0 $\pm 2$ Hz	RV16/SV-94P (F-2)

## 9-21. SEARCH X1 ADJUSTMENT

[Connection]



[Preparation]

- CH-1 AUDIO IN:  $3000 \pm 1$  kHz  $-60$  dBs
- Insert a BCT-20K cassette tape, and then record above signal.  
\* Recording near the middle of the tape is also possible (approximately five minutes).

Machine conditions for adjustment	Specifications	Adjustments
• Put the unit into the remote controller's FWD-SEARCH $\times 1$ mode near the middle of the tape.	AUDIO OUT CH-1 connector  $2950 \pm 10$ Hz	• RV17/SV-94P (F-2)
• Set the (3 kHz) recorded BCT-20K cassette tape to its middle.	<Reference>  When FWD-SEARCH $\times 1/30$ mode. $100 \pm 5$ Hz	
• Remote controller (BVR-800 or the equivalent)	When FWD-SEARCH $\times 5$ mode. $8700 \pm 500$ Hz	
• Frequency counter		

## 9-22. QUICK START ADJUSTMENT

### Step 1

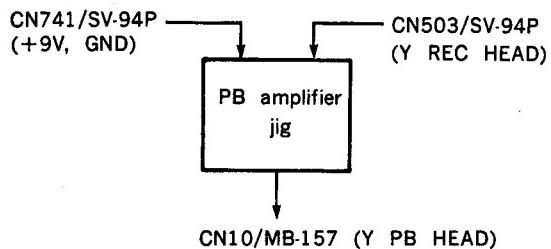
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>Connect as follows with shorting clips. TP22/SY-110 (C-1) <math>\leftrightarrow</math> GND TP16/SV-94P (F-3) <math>\leftrightarrow</math> GND TP46/SV-94P (A-3) <math>\leftrightarrow</math> GND</li> <li>Play back color bar signal on the alignment tape CR5-1A PS.</li> <li>After the adjustment, remove the shorting clips.</li> </ul>	<p>CH-1: TP44/SV-94P (J-1) CH-2: TP21/SV-94P (E-2)</p> <p>A = <math>1.25 \pm 0.25</math> msec</p>	<p>• RV22/SV-94P (B-1)</p> <p>• Adjust the center of the jitter.</p>

### Step 2 Check

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>REC mode</li> <li>Press the PAUSE button five times each two seconds.</li> <li>Play back the recorded portion.</li> </ul>	<p>CH-1: TP44/SV-94P (J-1) CH-2: TP21/SV-94P (E-2)</p> <p>A <math>\leq 0.5</math> msec B <math>\leq 1.0</math> msec</p> <p>*When specification is not satisfied, perform readjustment within the spec. in the step1.</p>	

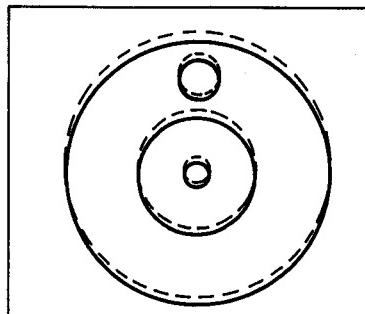
## 9-23. RECORDING PICTURE SPLIT ADJUSTMENT

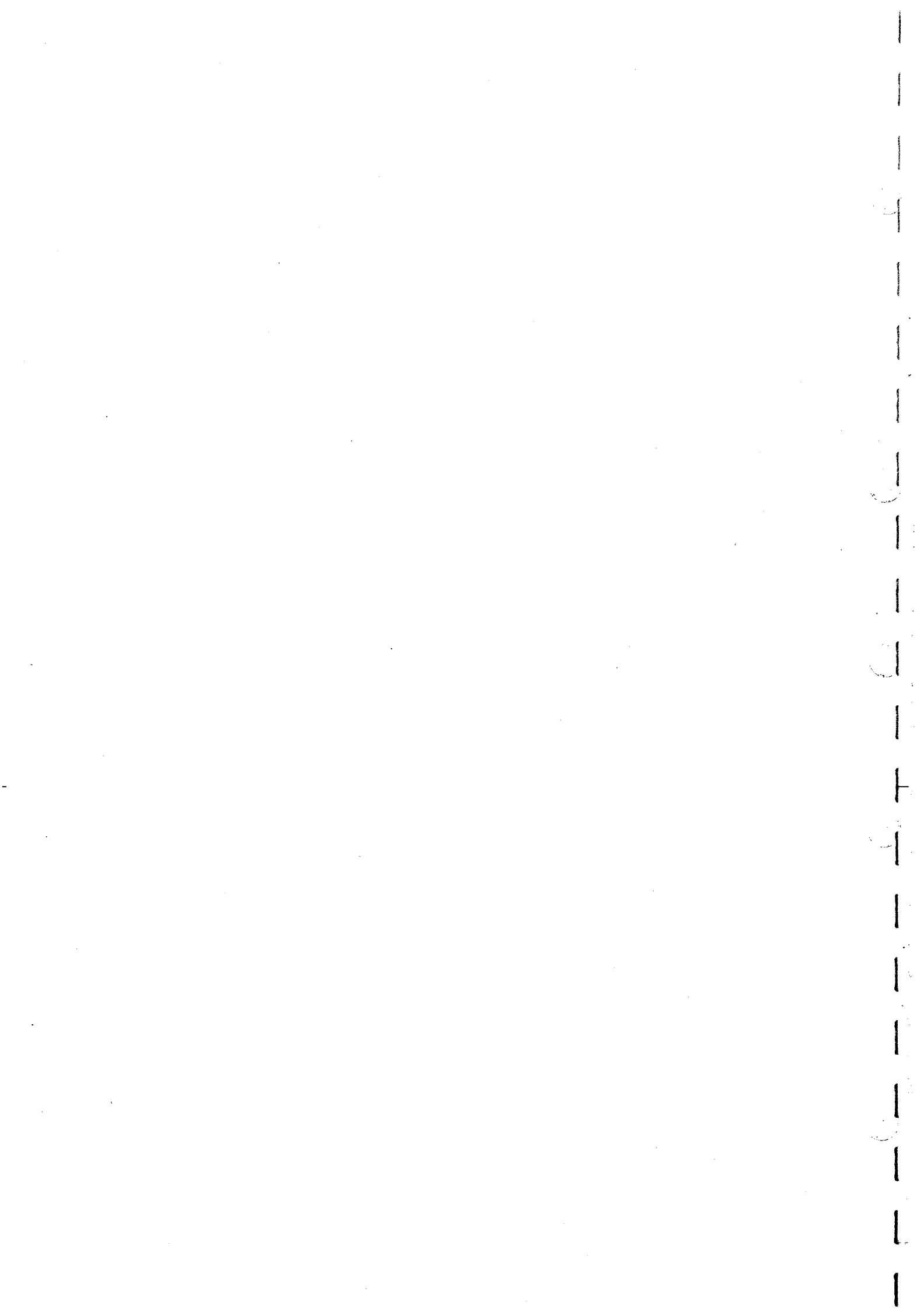
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect a monitor to the VIDEO OUT connector.</li> <li>Connect the PB amplifier jig.</li> <li>Connect TP16 on the SV-94P Board (F-3) to GND with a shorting clip.</li> <li>S1/ENC-6P: ON</li> <li>Play back C-monoscope signal on the alignment tape CR5-1A PS.</li> <li>Put the monitor into the H-DELAY mode.</li> <li>After the adjustment, set S1 on the ENC-6P Board to OFF again, and then remove the shorting clip.</li> </ul>	<p>monitor</p> <p>picture splitting point</p> <p>picture split <math>A \leq 1\mu\text{sec}</math></p> <p>A</p>	
	<p>If the specification is not satisfied, perform adjustment as follows:</p> <p>Step 1 Check the picture splitting point.  Step 2 Set RV12 to the mechanical center position.  Step 3 Adjust the picture splitting point to the former position with RV11.  Step 4 Minimize the picture split A with RV12.</p>	<input checked="" type="checkbox"/> RV11/SV-94P (E-2) <input checked="" type="checkbox"/> RV12/SV-94P (D-1)

## 9-24. V JITTER ADJUSTMENT IN THE STILL MODE

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"><li>• Connect a monitor to the VIDEO OUT connector.</li><li>• Play back C-monoscope signal on the alignment tape CR5-1A PS.</li><li>• PLAY · PAUSE mode</li></ul>	monitor  <p>Minimize the V jitter</p>	• RV36/SV-94P (C-3)



## SECTION 10

### AUDIO SYSTEM ALIGNMENT

**[Required equipment]**

- Audio oscillator
- Audio attenuator
- AC voltmeter
- Spectrum analyzer
- Dual-trace oscilloscope
- Alignment Tape CR5-1A PS (8-960-098-37)

• Alignment tape CR5-1B PS (8-960-096-91)

**Contents**

TIME min. sec	VIDEO TRACK	AUDIO TRACK
0: 00	Color Bars	Blank
4: 55	Blank	
5: 00		
	Gated Sweep	1 kHz/0 dB* <sup>1</sup>
8: 55	Blank	
9: 00		
	Y/C Delay	10 kHz/-10 dB
10: 55	Blank	
11: 00		
	2T Pulse & Bar	1 kHz~15 kHz/-20 dB* <sup>2</sup> 1 kHz (reference)
12: 55	Blank	
13: 00		
	C-Linearity	40 7 k 10 k 15 k
14: 55	Blank	
15: 00		
	C-Monoscope Switching position is shifted.	Blank
16: 55		
18: 55	Blank	Blank

**Notes :**

- \* 1. When this tape is reproduced in the audio reference level check or adjustment, the output level (0 dB) should be corrected according to the correction value below.

Example) Correction value = -0.5 dB

Output level = 0 dB - 0.5 dB =

-0.5 dB

- \* 2. The audio signal frequencies are recorded 30 seconds at a time, and it is repeated two times. When this tape is reproduced in the audio frequency response check or adjustment, the output level should be corrected according to the correction value.

**Contents**

TIME min. sec	VIDEO TRACK	AFM
0: 00	V.Locked Sweep	
2: 00		
	Gated Sweep (CTDM)	
5: 00		
	Pulse & Bar (CTDM)	
8: 00		
	Gated Sweep	
11: 00		
	Pulse & Bar	
14: 00		
		400 Hz SINE WAVE 25 kHz DEVIATION
16: 30	Color Bars (100%)	
17: 00		75 kHz DEVIATION
	Bowtie & 10T	
19: 00		
	Line 17 Signal	
22: 00		
	C Linearity	
24: 00		Flat Field (CTDM)
26: 00		Color Bars with Dropout
28: 00		Color Multi Pulse with VISC
30: 00		

- Alignment Tape CR8-1B PS (8-960-096-86)

## Contents

TIME min. sec	AUDIO TRACK	VIDEO TRACK	CTL TRACK
00: 00	1 kHz OVU	Black Burst	CTL
02: 30	Blank (only Bias)	Black Burst	CTL
03: 00	15 kHz OVU	Black Burst	CTL
05: 00	1 kHz -20VU	Black Burst	CTL
06: 00	40 Hz -20VU 7 kHz -20VU 10 kHz -20VU 15 kHz -20VU	Black Burst	CTL
08: 00	1 kHz OVU	—	1 kHz Sine Wave
10: 00			

### [NOTE]

When replacing the VRs described below, be sure to turn the VRs fully counterclockwise direction from viewing the component side.

RV1 on the HP-36 Board  
RV1 on the VR-63 Board

### [Switch Setting]

#### • Front panel

CH-1 AUDIO REC level switch : MANUAL  
CH-2 AUDIO REC level switch : MANUAL  
METER select switch : AUDIO

#### • Connector Panel

CAMERA/LINE select switch : LINE (CH-1 to CH-4)  
AUDIO IN level select switch : +4dB (CH-1 to CH-4)  
AFM INPUT switch : CH-3/CH-4  
EE select switch : NORMAL  
CH-4 OUT switch : CH-4  
CH-1 +48V switch : OFF  
AUDIO NR switch : OFF  
MONITOR select switch : OFF (CH-1 to CH-4)  
CONF1 switch : Y AUDIO  
VIDEO IN select switch : LINE  
TBC switch : OFF  
DUB switch : CH-2

These switches and volume controls should not be touched unless otherwise specified.

### [Blank Tape]

The "Blank Tape" described in the adjustment item indicates the cassette tape on which no video and audio signals are recorded.

When performing the audio system alignment, extend the AU-93P Board with an extension board (EX-150 Board).

When performing Longitudinal Audio system alignment, set S1 on the AU-93P Board (E-3) to the LV102 side. After alignment, set S1 to the former position. Check that the S2 on the AU-93P Board (C-1) is set to the CH-1 side.

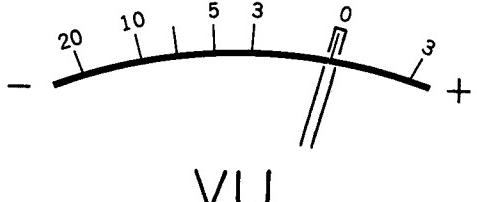
## 10-1. EE LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"><li>• EE mode</li><li>• AUDIO IN CH-1/CH-2 : 1 kHz, +4 dBs</li><li>AUDIO IN CH-3/CH-4 : 400Hz, +4 dBs</li></ul>	<p>CH-1: TP102/AU-93P (F-4) CH-2: TP202/AU-93P (F-4)</p> <p style="text-align: center;">-10±0.1 dBs</p> <p>CH-3: pin 1 of the NR-19 Board/AU-93P (C-2) CH-4: pin 10 of the NR-19 Board/AU-93P (C-2)</p> <p style="text-align: center;">-19.5±0.1 dBs</p> <p>Note: Be careful not to touch the REC VRs which have been adjusted.</p>	<ul style="list-style-type: none"><li>● CH-1/CH-2: CH-1, CH-2 REC VRs on the front panel</li><li>● CH-3/CH-4: CH-3, CH-4 REC VRs on the front panel</li></ul>

## 10-2. LIMITER OPERATION LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"><li>• Set the CH-1/CH-2 AUDIO IN level select switch to -60 dB.</li><li>• EE mode</li><li>• AUDIO IN CH-1/CH-2: 1kHz, -30 dBs</li><li>• After the adjustment, set the CH-1/CH-2 AUDIO IN level select switch to +4 dB.</li></ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)</p> <p style="text-align: center;">+15±0.2 dBm</p>	<ul style="list-style-type: none"><li>● CH-1: RV101/AU-93P (D-3)</li><li>● CH-2: RV201/AU-93P (C-3)</li></ul>

### 10-3. LEVEL METER CALIBRATION ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>EE mode</li> <li>AUDIO IN (CH-1 to CH-4): 1 kHz, +4 dBs</li> <li>METER select switch: AUDIO</li> <li>Put the unit upright and place the meter at horizontal level.</li> </ul>	<p>Audio level meter (CH-1 to CH-4)</p>  <p>The pointer reading should be zero.</p> <p>&lt;Reference&gt;</p> <p>When putting the unit upright and placing the meter at the vertical level.</p>	<ul style="list-style-type: none"> <li>CH-1: RV5/MT-34 (A-1)</li> <li>CH-2: RV6/MT-34 (C-1)</li> <li>CH-3: RV7/MT-34 (D-1)</li> <li>CH-4: RV8/MT-34 (E-1)</li> </ul>

### 10-4. PB FREQUENCY RESPONSE ADJUSTMENT

#### Step 1. PB Frequency Response Check

Machine conditions for adjustment	Specifications	Adjustments																	
<ul style="list-style-type: none"> <li>Play back 1 kHz, 7 kHz, 10 kHz and 15 kHz signals on the alignment tape CR5-1A PS.</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency</th> <th colspan="2">Level</th> </tr> <tr> <th>CH-1</th> <th>CH-2</th> </tr> </thead> <tbody> <tr> <td>1 kHz</td> <td>Reference</td> <td>Reference</td> </tr> <tr> <td>7 kHz</td> <td>Reference <math>\pm 0.3</math> dB</td> <td>Reference <math>\pm 0.3</math> dB</td> </tr> <tr> <td>10 kHz</td> <td>Reference <math>\pm 0.5</math> dB</td> <td>Reference <math>\pm 0.5</math> dB</td> </tr> <tr> <td>15 kHz</td> <td>Reference <math>\pm 0.7</math> dB</td> <td>Reference <math>\pm 0.2</math> dB</td> </tr> </tbody> </table> <p>Note: Each audio level should be corrected according to the correction value.</p> <p>If the specification is not satisfied, proceed to the Step 2.</p>	Frequency	Level		CH-1	CH-2	1 kHz	Reference	Reference	7 kHz	Reference $\pm 0.3$ dB	Reference $\pm 0.3$ dB	10 kHz	Reference $\pm 0.5$ dB	Reference $\pm 0.5$ dB	15 kHz	Reference $\pm 0.7$ dB	Reference $\pm 0.2$ dB	<ul style="list-style-type: none"> <li>7 kHz Adjustment</li> <li>CH-1: RV302/AU-93P (D-2)</li> <li>CH-2: RV352/AU-93P (D-2)</li> <li>10 kHz and 15 kHz Adjustment</li> <li>CH-1: RV304/AU-93P (D-1)</li> <li>CH-2: RV354/AU-93P (D-1)</li> </ul>
Frequency	Level																		
	CH-1	CH-2																	
1 kHz	Reference	Reference																	
7 kHz	Reference $\pm 0.3$ dB	Reference $\pm 0.3$ dB																	
10 kHz	Reference $\pm 0.5$ dB	Reference $\pm 0.5$ dB																	
15 kHz	Reference $\pm 0.7$ dB	Reference $\pm 0.2$ dB																	

**Step 2. In case the high-frequency level is lower than the specified value.**

Machine conditions for adjustment	Specifications	Adjustments
• Play back 1 kHz, 7 kHz, 10 kHz and 15 kHz signals on the alignment tape CR5-1A PS.	<ol style="list-style-type: none"> <li>1. Solder-bridge slots SL301 and SL351 and perform Step 1.</li> <li>2. When the specification is not satisfied: Solder-bridge slots SL302 and SL352 and perform Step 1.</li> <li>3. When the specification is not satisfied: Solder-bridge slots SL303 and SL353 and perform Step 1.</li> </ol>	

#### 10-5. PB LEVEL ADJUSTMENT

**Step 1.**

Machine conditions for adjustment	Specifications	Adjustments
• Play back 1 kHz, 0 VU signals on the alignment tape CR8-1B PS	CH-1: TP102/AU-93P (F-4) CH-2: TP202/AU-93P (F-4)  $-10 \pm 0.2$ dBs	<input checked="" type="checkbox"/> CH-1: RV303/AU-93P (D-3) <input checked="" type="checkbox"/> CH-2: RV353/AU-93P (C-3)

**Step 2.**

Machine conditions for adjustment	Specifications	Adjustments
• Play back 1 kHz, 0 VU signals on the alignment tape CR8-1B PS.	AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)  $+4 \pm 0.3$ dBm  Note: Be careful not to touch the PB VRs which have been adjusted.	<input checked="" type="checkbox"/> CH-1: CH-1 PB VR <input checked="" type="checkbox"/> CH-2: CH-2 PB VR (on the front panel)

#### 10-6. FULL ERASE CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
• Insert a BCT-20M cassette tape.  • REC mode	TP851/AU-93P (G-1)  $308 \pm 5$ mVrms	<input checked="" type="checkbox"/> RV851/AU-93P (H-2)

## 10-7. DUB ERASE CURRENT ADJUSTMENT

\*After the DUB Erase Current Adjustment, the CH-1 and CH-2 DUB phases should coincide with the signal phase at TP852.

If not, finely adjust them with LV901 and LV951. (Be sure to change the phase in the channel with higher level).

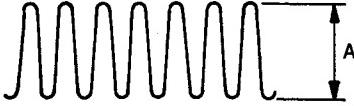
### 10-7-1. CH-1 DUB Erase Current Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1/CH-2 : No signal	Step1. TP852/AU-93P (F-1) $130 \pm 1$ kHz	• RV801/AU-93P (G-4)
• Insert a recorded BCT-20M cassette tape on which signals have been recorded.	Step2. TP902/AU-93P (F-1) (TRIG): TP852/AU-93P (H-4)	• LV901/AU-93P (G-1) • CP902/AU-93P (G-2)
• CH-1 DUB mode	Maximize the level.  * Adjustment should be performed within the range where the signal phase is locked.	
	Step3. TP902/AU-93P (F-1)  $440 \pm 0$ mVrms	• RV903/AU-93P (F-2)

### 10-7-2. CH-2 DUB Erase Current Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• AUDIO IN CH-1/CH-2 : No signal	Step1. TP952/AU-93P (G-1) (TRIG): TP852/AU-93P (H-4)	• LV951/AU-93P (G-1) • CP952/AU-93P (G-2)
• Insert a recorded BCT-20M cassette tape on which signals have been recorded.	Maximize the level.  * Adjustment should be performed within the range where the signal phase is locked.	
• CH-2 DUB mode	Step2. TP952/AU-93P (G-1)  $440 \pm 0$ mVrms	• RV953/AU-93P (G-2)

## 10-8. BIAS CURRENT PRELIMINARY ADJUSTMENT

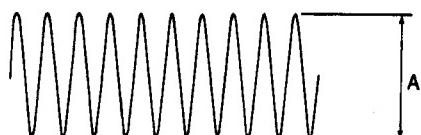
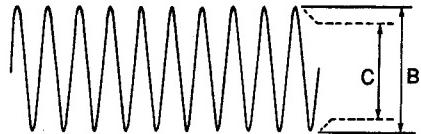
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN (CH-1 to CH-4): No signals</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> </ul>	<p>CH-1 : TP303/AU-93P (D-1) (GND) : TP304/AU-93P (D-1)</p> <p>CH-2 : TP353/AU-93P (D-1) (GND) : TP354/AU-93P (C-1)</p> <p>(TRIG) : TP852/AU-93P (H-4)</p> <p>* Check that signal waveform at TP is locked to TRIG, and proceed to the next adjustment.</p>	
	<p>Step1.</p>  <p>A = MAX</p>	<input checked="" type="checkbox"/> CH-1: CP901/AU-93P (G-3) <input checked="" type="checkbox"/> CH-2: CP951/AU-93P (G-3)
	<p>Step2.</p> <p>A = <math>15 \pm 2</math> mVrms</p>	<input checked="" type="checkbox"/> CH-1: RV901/AU-93P (G-3) <input checked="" type="checkbox"/> CH-2: RV951/AU-93P (H-3)

## 10-9. REC BIAS TRAP ADJUSTMENT

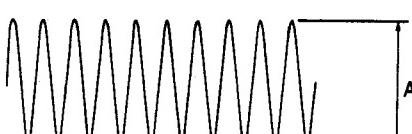
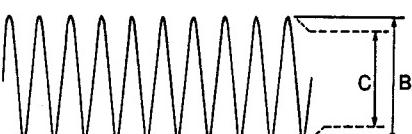
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> <li>AUDIO IN CH-1/CH-2: No signals</li> </ul>	<p>CH-1 : TP302/AU-93P (E-2)        CH-2 : TP352/AU-93P (F-1)        (TRIG) : TP852/AU-93P (H-4)</p> <p>Minimize the bias leak. (<math>\leq 10</math> dBs)</p> <p>* Check that the leak bias is locked to TRIG.</p>	<input checked="" type="checkbox"/> CH-1: LV301/AU-93P (E-2) <input checked="" type="checkbox"/> CH-2: LV351/AU-93P (E-1)

## 10-10. BIAS CURRENT ADJUSTMENT (METAL)

### Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• CH-1 AUDIO IN: 1kHz, +4dBs</li> <li>• CH-4 OUT SW: MON</li> <li>CH-1 MONITOR SELECT SW: ON</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• REC mode</li> <li>• Turn RV901 on the AU-93P Board(G-3) fully counter clockwise direction temporarily.</li> </ul>	<p>AUDIO OUT CH-4 connector (at 600-ohm load)</p>  <p><math>A = (\text{maximum level}) - 2\text{dB}</math></p> <p>CH-1: TP303/AU-93P(D-1) (GND): TP304/AU-93P(D-1)</p>  <p>① <math>B \geq 18 \text{ mVrms}</math> <math>C = 15 \pm 0.2 \text{ mVrms}</math></p> <p>② <math>B \leq 18 \text{ mVrms}</math> <math>C = B - 3 \pm 0.2 \text{ mVrms}</math></p> <p>* The signal waveform at TP should be locked to the TRIG. TRIG: TP852/AU-93P(H-4)</p>	<p>④ RV901/AU-93P(G-3) Turn RV901 gradually clockwise direction.</p> <p>⑤ RV901/AU-93P(G-3)</p>
<ul style="list-style-type: none"> <li>• After the adjustment CH-4 OUT SW: CH-4</li> <li>CH-1 MONITOR SELECT SW: OFF</li> </ul>		

## Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>CH-2 AUDIO IN: 1kHz, +4dBs</li> <li>CH-4 OUT SW: MON</li> <li>CH-2 MONITOR SELECT SW: ON</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> <li>Turn RV951 on the AU-93P Board (H-3) fully counter-clockwise direction temporarily.</li> <li>After the adjustment, CH-4 OUT SW: CH-4 CH-2 MONITOR SELECT SW: OFF</li> </ul>	<p>AUDIO OUT CH-4 connector (at 600-ohm load)</p>  <p><math>A = (\text{maximum level}) - 2\text{dB}</math></p> <p>CH-1: TP353/AU-93P(D-1) (GND): TP354/AU-93P(C-1)</p>  <p>① <math>B \geq 18 \text{ mVrms}</math>  <math>C = 15 \pm 0.2 \text{ mVrms}</math></p> <p>② <math>B \leq 18 \text{ mVrms}</math>  <math>C = B - 3 \pm 0.2 \text{ mVrms}</math></p> <p>* The signal waveform at TP should be locked to the TRIG.  TRIG: TP852/AU-93P(H-4)</p>	<p>RV951/AU-93P(H-3)</p>
		<p>RV951/AU-93P(H-3)</p>

## 10-11. BIAS CURRENT ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2 : No signals</li> <li>Insert a BCT-20K cassette tape.</li> <li>REC mode</li> </ul>	<p>CH-1 : TP303/AU-93P (D-1) (GND) : TP304/AU-93P (D-1)</p> <p>CH-2 : TP353/AU-93P (D-1) (GND) : TP354/AU-93P (C-1)</p> <p>(TRIG) : TP852/AU-93P (H-4)</p> <p><math>11 \pm 0.2 \text{ mVrms}</math></p> <p>* When the adjustment value is less than 11 mVrms.  Value <math>\pm 0.2 \text{ mVrms}</math></p> <p>Note: The signal phase should be locked.</p>	<p>CH-1: RV902/AU-93P (G-3)  CH-2: RV952/AU-93P (G-3)</p>

## 10-12. DUB BIAS TRAP ADJUSTMENT

### Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN: No signals</li> <li>Insert a BCT-20M cassette tape on which signals have been recorded.</li> <li>CH-2 DUB mode</li> </ul>	<p>CH-1: TP305/AU-93P (D-3)</p> <p>Minimize the level.</p>	<ul style="list-style-type: none"> <li>CH-1: LV302/AU-93P (D-2)</li> </ul>

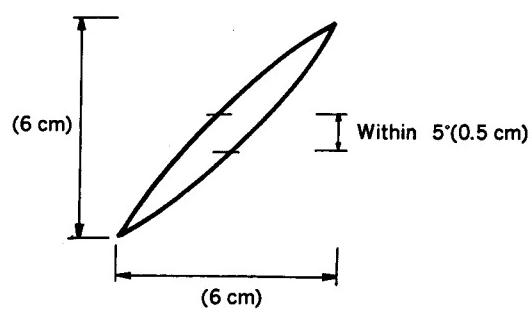
### Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN: No signals</li> <li>Insert a BCT-20M cassette tape on which signals have been recorded.</li> <li>CH-1 DUB mode</li> </ul>	<p>CH-2: TP355/AU-93P (C-3)</p> <p>Minimize the level.</p>	<ul style="list-style-type: none"> <li>CH-2: LV352/AU-93P (C-2)</li> </ul>

## 10-13. OVERALL FREQUENCY RESPONSE ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments										
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2: 40, 1 k, 10 k, 15 k (Hz), -16dBs</li> <li>Insert a BCT-20K cassette tape.</li> <li>Play back the self-recorded tape.</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load) AUDIO OUT CH-2 connector (at 600-ohm load)</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>40Hz</td> <td>Reference <math>\pm 3\text{dB}</math></td> </tr> <tr> <td>1kHz</td> <td>Reference</td> </tr> <tr> <td>10kHz</td> <td>Reference <math>\pm 0.5\text{dB}</math></td> </tr> <tr> <td>15kHz</td> <td>Reference <math>\pm 0.5\text{dB}</math></td> </tr> </tbody> </table>	Frequency	Specification	40Hz	Reference $\pm 3\text{dB}$	1kHz	Reference	10kHz	Reference $\pm 0.5\text{dB}$	15kHz	Reference $\pm 0.5\text{dB}$	<ul style="list-style-type: none"> <li>10 kHz and 15kHz signal portion</li> <li>CH-1: RV1/AR-12P (F-2) [A2]</li> <li>CH-2: RV1/AR-12P (F-2) [A3]</li> <li>15 kHz signal portion only</li> <li>CH-1: LV101/AU-93P (E-3)</li> <li>CH-2: LV201/AU-93P (F-3)</li> </ul>
Frequency	Specification											
40Hz	Reference $\pm 3\text{dB}$											
1kHz	Reference											
10kHz	Reference $\pm 0.5\text{dB}$											
15kHz	Reference $\pm 0.5\text{dB}$											

## 10-14. OVERALL PHASE ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Oscilloscope connection (in X-Y mode)           <ul style="list-style-type: none"> <li>CH-1: CH-1 AUDIO OUT connector</li> <li>CH-2: CH-2 AUDIO OUT connector</li> </ul> </li> <li>AUDIO IN CH-1/CH-2: 15 kHz, +4 dBs</li> <li>Insert a BCT-20K cassette tape.</li> <li>Play back the self-recorded tape.</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load)            AUDIO OUT CH-2 connector (at 600-ohm load)</p> 	<p>RV2/AR-12P (F-2) [A2]            (F-2) [A3]</p> <p>* Either A2 or A3.</p>

## 10-15. OVERALL LEVEL ADJUSTMENT (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2: 1 kHz, +4dBs</li> <li>Insert a BCT-20K cassette tape.</li> <li>Play back the self-recorded tape.</li> </ul>	<p>CH-1: TP102/AU-93P (F-4)            CH-2: TP202/AU-93P (F-4)</p> <p>-10±0.1 dBs</p>	<p>CH-1: RV102/AU-93P (F-2)            CH-2: RV202/AU-93P (F-1)</p>

## 10-16. CONFI OUTPUT LEVEL ADJUSTMENT

### Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1: 1kHz,+4dBs</li> <li>Insert a BCT-20K cassette tape.</li> <li>REC mode</li> <li>CH-1 MONITOR select SW: ON</li> <li>CH-4 OUT SW: MON</li> </ul>	<p>AUDIO OUT CH-4 connector (at 600-ohm load)</p> <p>+3±1 dBm</p>	<p>RV1/CO-8</p>

**Step 2. CH-2 Adjustment**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• AUDIO IN CH-2: 1kHz, +4dBs</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> <li>• CH-1 MONITOR select SW : OFF</li> <li>• CH-2 MONITOR select SW : ON</li> <li>• CH-4 OUT SW : MON</li> <li>• After the adjustment, return the CH-2 MONITOR select switch to OFF.</li> </ul>	<p>AUDIO OUT CH-4 connector (at 600-ohm load)</p> <p style="text-align: center;"><math>+3 \pm 1</math> dBm</p>	● RV2/C0-8

**10-17. CONFI TC CANCEL ADJUSTMENT**

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2: No signals</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> <li>• CH-1, 2 MONITOR select SW : ON</li> <li>• CH-4 OUT SW : MON</li> <li>• After the adjustment, return the CH-1/CH-2 MONITOR select switch to OFF and the CH-4 OUT switch to CH-4.</li> </ul>	<p>AUDIO OUT CH-4 connector (at 600-ohm load)</p> <p style="text-align: center;">Minimize the level.</p>	● RV702/AU-93P (C-1)

## 10-18. INSERT CROSSTALK CANCEL ADJUSTMENT

### Step 1. CH-1 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1: No signals</li> <li>AUDIO IN CH-2: 5 kHz, +4 dBs</li> <li>Insert a BCT-20K cassette tape on which only CTL signals have been recorded.</li> <li>CH-2 DUB mode</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load)</p> <p>Minimize the crosstalk (5 kHz) in CH-2.</p> <p>Note: The AUDIO OUT level difference between CH-1 and CH-2 should be 20dB or more.</p>	<input checked="" type="checkbox"/> RV1/DC-33 <input checked="" type="checkbox"/> RV2/DC-33 Alternately adjust.

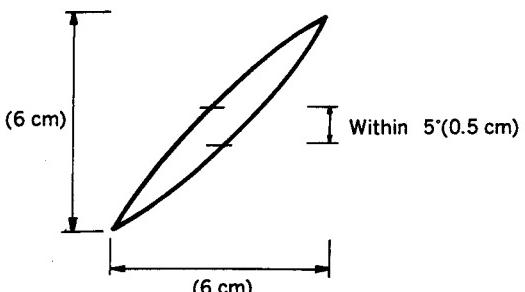
### Step 2. CH-2 Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1: 5 kHz, +4dBs</li> <li>AUDIO IN CH-2: No signals</li> <li>Insert a BCT-20K cassette tape on which only CTL signals have been recorded.</li> <li>CH-1 DUB mode</li> </ul>	<p>AUDIO OUT CH-2 connector (at 600-ohm load)</p> <p>Minimize the crosstalk (5 kHz) in CH-1.</p> <p>Note: The AUDIO OUT level difference between CH-1 and CH-2 should be 20 dB or more.</p>	<input checked="" type="checkbox"/> RV3/DC-33 <input checked="" type="checkbox"/> RV4/DC-33 Alternately adjust.

## 10-19. OVERALL FREQUENCY RESPONSE ADJUSTMENT (METAL)

Machine conditions for adjustment	Specifications	Adjustments										
<ul style="list-style-type: none"> <li>S1/AU-93P: OFF</li> <li>AUDIO IN CH-1/CH-2: 40, 1 k, 10 k, 15 k (Hz), -16 dBs</li> <li>Insert a BCT-20M cassette tape.</li> <li>Play back the self-recorded tape.</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load)</p> <p>AUDIO OUT CH-2 connector (at 600-ohm load)</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>40Hz</td> <td>Reference <math>\pm 3</math> dB</td> </tr> <tr> <td>1kHz</td> <td>Reference</td> </tr> <tr> <td>10kHz</td> <td>Reference <math>\pm 0.5</math> dB</td> </tr> <tr> <td>15kHz</td> <td>Reference <math>\pm 0.5</math> dB</td> </tr> </tbody> </table>	Frequency	Specification	40Hz	Reference $\pm 3$ dB	1kHz	Reference	10kHz	Reference $\pm 0.5$ dB	15kHz	Reference $\pm 0.5$ dB	<ul style="list-style-type: none"> <li>10 kHz and 15 kHz signal portion</li> <li><input checked="" type="checkbox"/> CH-1: RV3/AR-12P (F-2) [A2]</li> <li><input checked="" type="checkbox"/> CH-2: RV3/AR-12P (F-2) [A3]</li> <li>15 kHz signal portion only</li> <li><input checked="" type="checkbox"/> CH-1: LV102/AU-93P (E-3)</li> <li><input checked="" type="checkbox"/> CH-2: LV202/AU-93P (F-3)</li> </ul>
Frequency	Specification											
40Hz	Reference $\pm 3$ dB											
1kHz	Reference											
10kHz	Reference $\pm 0.5$ dB											
15kHz	Reference $\pm 0.5$ dB											

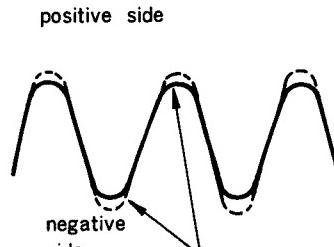
## 10-20. OVERALL PHASE ADJUSTMENT (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Oscilloscope connection (in X-Y mode)           <ul style="list-style-type: none"> <li>CH-1: AUDIO OUT CH-1 connector</li> <li>CH-2: AUDIO OUT CH-2 connector</li> </ul> </li> <li>AUDIO IN CH-1/CH-2: 15 kHz, +4 dBs</li> <li>Insert a BCT-20M cassette tape.</li> <li>Play back the self-recorded tape.</li> </ul>	<p>AUDIO OUT CH-1 connector (at 600-ohm load)            AUDIO OUT CH-2 connector (at 600-ohm load)</p> 	<p>② RV4/AR-12P [A2]            [A3]</p> <p>* Either A2 or A3.</p>

## 10-21. OVERALL LEVEL ADJUSTMENT (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2: 1kHz, +4 dBs</li> <li>Insert a BCT-20M cassette tape.</li> <li>Play back the self-recorded tape.</li> </ul>	<p>CH-1: TP102/AU-93P (F-4)            CH-2: TP202/AU-93P (F-4)</p> <p>-10±0.3 dBs            &lt;Reference&gt;            AUDIO OUT CH-1 connector (at 600-ohm load)            AUDIO OUT CH-2 connector (at 600-ohm load)</p> <p>+4±1 dBm</p>	<p>② CH-1: RV103/AU-93P (F-2)            ② CH-2: RV203/AU-93P (F-1)</p>

## 10-22. AFM LIMITER LEVEL ADJUSTMENT

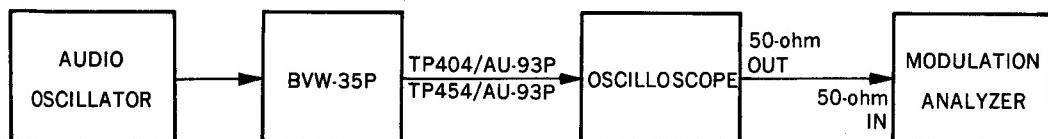
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-3/CH-4: 400Hz</li> <li>LEVEL SELECT SW: -20 dB</li> <li>Set pins 1 and 10 of the NR-19 Board to -19.5 dBs with the oscillator. Then, raise the level by 20 dB.</li> <li>EE mode</li> <li>Set the CH-3/CH-4 AUDIO IN level select SW to +4 dB again.</li> </ul>	<p>CH-3: TP405/AU-93P (B-2) CH-4: TP455/AU-93P (B-2)</p> <p style="text-align: center;">positive side</p>  <p>Adjust at point where the waveform distortion appears.</p> <p>* When the waveform distortion of the positive side appears at first, short SL502 on the AU-93P Board (B-3).</p>	<ul style="list-style-type: none"> <li>CH-3: RV405/AU-93P (B-2)</li> <li>CH-4: RV455/AU-93P (B-3)</li> </ul>

## 10-23. AFM CARRIER FREQUENCY ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-3/CH-4: No signal</li> <li>EE mode</li> </ul>	<p>Step1 TP404/AU-93P (A-3)</p> <p style="text-align: center;"><math>310 \pm 3 \text{ kHz}</math></p>	<ul style="list-style-type: none"> <li>CH-3: RV404/AU-93P (A-4)</li> </ul>
	<p>Step2 TP454/AU-93P (C-3)</p> <p style="text-align: center;"><math>540 \pm 3 \text{ kHz}</math></p>	<ul style="list-style-type: none"> <li>CH-4: RV454/AU-93P (C-4)</li> </ul>

## 10-24. AFM DEVIATION ADJUSTMENT

[Connection]

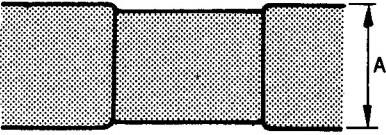


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-3/CH-4: 400 Hz, +4 dBs</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> </ul>	CH-3: TP404/AU-93P (A-3) CH-4: TP454/AU-93P (C-3)  $25 \pm 0.2$ kHz	<ul style="list-style-type: none"> <li>CH-3: RV403/AU-93P (A-3)</li> <li>CH-4: RV453/AU-93P (B-3)</li> </ul>

## 10-25. AFM RECORDING CURRENT ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect pin 2 of CN2 on the VRA-1 Board and GND with a 300-ohm resistor.</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> <li>AUDIO IN CH-3/CH-4: No signal</li> </ul>	Step 1 TP202/VRA-1  $310\text{ kHz}$ $540\text{ kHz}$ $A = 3.0 \pm 0.3$ dB	<ul style="list-style-type: none"> <li>RV547/AU-93P (A-4)</li> </ul>
Spectrum analyzer	Step 2 TP202/VRA-1  $310\text{ kHz}$ $540\text{ kHz}$ chroma carrier (approximately 5 MHz) $A = 23.0 \pm 0.5$ dB	<ul style="list-style-type: none"> <li>RV548/AU-93P (A-4)</li> </ul>

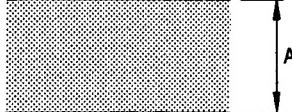
### 10-26. AFM PB RF LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-3/CH-4 : No signal</li> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP502/AU-93P (A-3)  $A = 2.0 \pm 0.1 \text{ Vpp}$	<input checked="" type="checkbox"/> RV550/AU-93P (A-2)

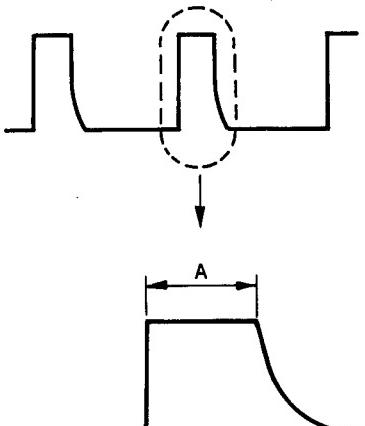
### 10-27. AFM PB LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	Step 1 CH-3: TP402/AU-93P (B-2) CH-4: TP452/AU-93P (B-2) $-19.5 \pm 0.2 \text{ dBs} \quad -19.5 \pm 0.2 \text{ dBs}$	<input checked="" type="checkbox"/> CH-3: RV402/AU-93P (C-4) <input checked="" type="checkbox"/> CH-4: RV452/AU-93P (B-4)
	Step 2 AUDIO OUT CH-3 connector (terminated at 600 ohms). AUDIO OUT CH-4 connector (terminated at 600 ohms) $4 \pm 0.5 \text{ dBm}$	<input checked="" type="checkbox"/> CH-3: Front panel: CH-3 PB VR <input checked="" type="checkbox"/> CH-4: Front panel: CH-4 PB VR

### 10-28. AFM D.O.C. LEVEL ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-3/CH-4 : No signal</li> <li>Playback the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	Pin 10 of IC503/AU-93P (A-1)  $A = 500 \pm 10 \text{ mVpp}$	<input checked="" type="checkbox"/> RV551/AU-93P (A-2)

## 10-29. AFM D.O.C. PULSE WIDTH ADJUSTMENT

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-3/CH-4: No signal</li> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP503/AU-93P (A-3)  $A = 12 \pm 1 \mu\text{sec}$	• RV549/AU-93P (B-2)

## SECTION 11

### VIDEO SYSTEM ALIGNMENT

**[Equipment Required]**

- Dual trace oscilloscope
- Frequency counter
- PAL signal generator (TEKTRONIX 1411 or equivalent)
- Component signal generator (TEKTRONIX TSG-300 or equivalent)
- Sweep generator
- Vectorscope
- Waveform monitor
- Component waveform monitor (TEKTRONIX WFM-300 or equivalent)
- Waveform vector monitor (TEKTRONIX 1751 or equivalent)
- VISC doubler
- Spectrum analyzer
- Digital voltmeter
- Shorting clip
- Blank tape (BCT-20K or equivalent)
- Blank tape (BCT-20M or equivalent)
- BETACAM (SONY BVW-75P or equivalent)
- Alignment tape CR5-1A PS (8-960-098-37)

**Contents**

TIME min. sec	VIDEO TRACK	AUDIO TRACK
0: 00	Color Bars	
4: 55	Blank	Blank
5: 00		
	Gated Sweep	1 kHz/OdB*1
8: 55	Blank	
9: 00		
	Y/C Delay	10 kHz/-10 dB
10: 55	Blank	
11: 00		
	2T Pulse & Bar	1 k~15 kHz/-20dB*2
12: 55	Blank	1k (reference)
13: 00		
	C-Linearity	40 7k 10k 15k
14: 55	Blank	
15: 00		
	C-Monoscope (Switching position is shifted.)	Blank
16: 55	Blank	Blank
18: 55		

- Alignment tape CR5-1B PS (8-960-096-91)

#### Contents

TIME min. sec	VIDEO TRACK	AFM
0: 00	V.Locked Sweep	Non-modulation
2: 00	Gated Sweep (CTDM)	
5: 00	Pulse & Bar (CTDM)	
8: 00	Gated Sweep	
11: 00	Pulse & Bar	
14: 00		
16: 30	Color Bars (100%)	400 Hz SINE WAVE 25 kHz DEVIATION
17: 00		75 kHz DEVIATION
19: 00	Bowtie & 10T	Non-modulation
22: 00	Line 17 Signal	
24: 00	C Linearity	
26: 00	Flat Field (CTDM)	
28: 00	Color Bars with Dropout	
30: 00	Color Multi Pulse with VISC	

#### [Switch Setting]

##### Connector Panel

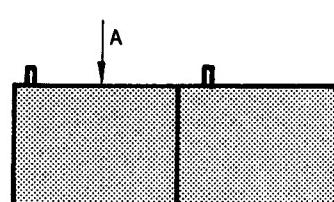
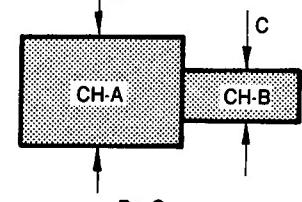
- EE SELECT SW; NORMAL
- VIDEO SW; LINE
- TBC SW; OFF
- DUB SW; CH-2
- CONFI SW; OFF
- TRACKING VR; center clicked position

These switches should not be touched unless otherwise specified.

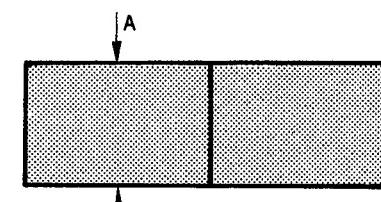
All of the Video boards (CEC-3P, DEC-30, ENC-6P and MDM-3P) should be extended with an extension board (EX-150 Board).

## 11-1. MDM BOARD ALIGNMENT (PLAYBACK SYSTEM)

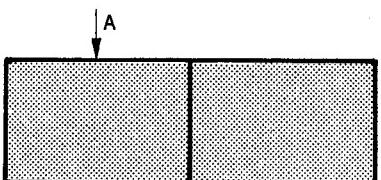
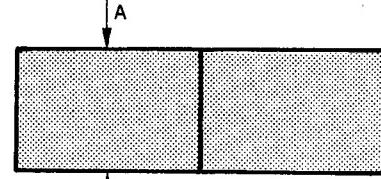
### 11-1-1. Y RF Balance/Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> <li>Maximize the RF signal level with the TRACKING control knob.</li> </ul>	<p>TP301/MDM-3P(F-4) Spec.1</p>  <p>Spec.2</p>  <p><math>A = 0.55 \pm 0.05 \text{ V}</math></p> <p><math>B = C</math></p> <p>TRIG: TP308/MDM-3P(F-3)</p>	<input checked="" type="checkbox"/> RV601/PA-60A[A301](F-4) <input checked="" type="checkbox"/> RV602/PA-60A[A301](F-4)

### 11-1-2. Y AGC Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set RV305 on the MDM-3P Board(G-4) to the mechanical center position.</li> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP302/MDM-3P(F-2)</p>  <p><math>A = 0.5 \pm 0.05 \text{ V}</math></p> <p>TRIG: TP308/MDM-3P(F-3)</p>	<input checked="" type="checkbox"/> RV603/RF-16A[A302](F-3)

### 11-1-3. Y HF Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1  • Play back the flat field signal on the alignment tape CR5-1B PS.	TP303/MDM-3P(F-2)   $A = 0.10 \pm 0.01 \text{ V}$ TRIG: TP308/MDM-3P(F-3)	• RV607/EQ-14[A303](F-3)
Step. 2  • Play back the flat field signal on the alignment tape CR5-1A PS.	TP303/MDM-3P(F-2)   $A = 0.20 \pm 0.01 \text{ V}$ TRIG: TP308/MDM-3P(F-3)	• RV620/FL-66

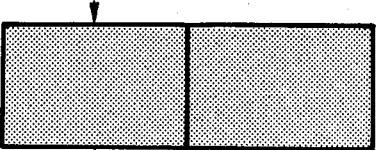
#### 11-1-4. C RF Balance Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> <li>Maximize the RF level with the TRACKING control knob.</li> </ul>	<p>TP401/MDM-3P(D-3) Spec.1</p> <p><math>A = 0.55 \pm 0.05 \text{ V}</math></p> <p>Spec.2</p> <p><math>B = C</math></p> <p>TRIG: TP408/MDM-3P(F-1)</p>	<input checked="" type="checkbox"/> RV601/PA-60A[A401](E-4) <input checked="" type="checkbox"/> RV602/PA-60A[A401](E-4)

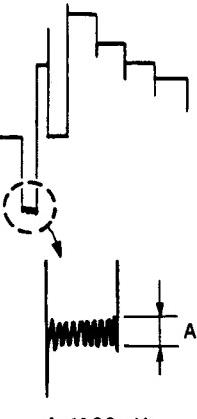
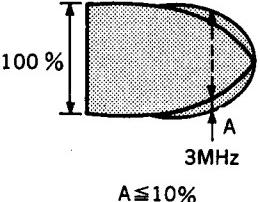
#### 11-1-5. C AGC Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP402/MDM-3P(D-3)</p> <p><math>A = 0.5 \pm 0.05 \text{ V}</math></p> <p>TRIG: TP408/MDM-3P(F-1)</p>	<input checked="" type="checkbox"/> RV603/RF-16A[A402](E-3)

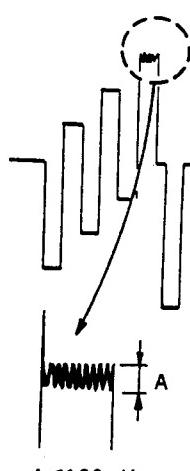
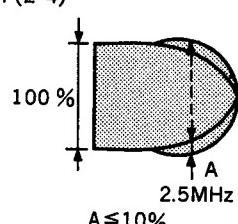
### 11-1-6. C HF Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> </ul>	TP403/MDM-3P(D-2)  $A = 0.2 \pm 0.01 \text{ V}$ TRIG: TP408/MDM-3P(F-1)	<span style="color: red;">●</span> RV607/EQ-14A[A403](E-3)

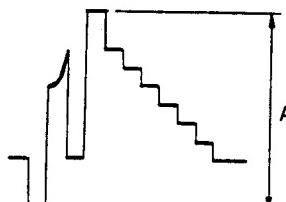
### 11-1-7. Y Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1 <ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1A PS.</li> </ul>	TP306/MDM-3P(F-4)  $A \leq 100 \text{ mV}$	<span style="color: red;">●</span> RV302/MDM-3P(F-2) <span style="color: red;">●</span> RV608/DM-58[A304](G-1) • Alternately adjust.
Step. 2 (Check) <ul style="list-style-type: none"> <li>Play back the gated sweep (CTDM) signal on the alignment tape CR5-1B PS.</li> </ul>	TP306/MDM-3P(F-4)  $A \leq 10\%$	

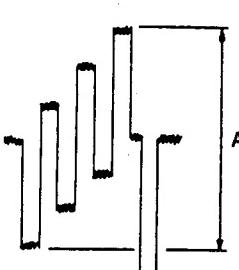
### 11-1-8. C Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1  • Play back the color bar signal on the alignment tape CR5-1A PS.	TP406/MDM-3P(E-4)   $A \leq 100\text{mV}$	• RV402/MDM-3P(D-2) • RV608/DM-58[A404](A-1) • Alternately adjust.
Step. 2 (Check)  • Play back the gated sweep (CTDM) signal on the alignment tape CR5-1B PS.	TP406/MDM-3P(E-4)   $A \leq 10\%$	

### 11-1-9. Y Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• Play back the color bar signal on the alignment tape CR5-1B PS.  • More than twenty seconds should elapse after the color bar signal is played back.	TP306/MDM-3P(F-4)   $A = 1 \pm 0.01 \text{ V}$	• RV609/VA-54[A305](G-3)

### 11-1-10. C Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP406/MDM-3P(E-4)  $A = 0.93 \pm 0.01V$ (Measure in the center of noise)	<input checked="" type="checkbox"/> RV609/VA-54[A405](C-1)

### 11-1-11. Y D.O.C Sensitivity Adjustment

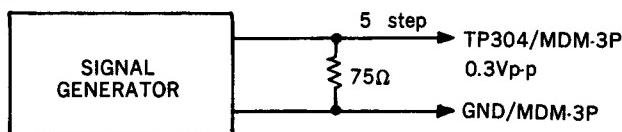
Machine conditions for adjustment	Specifications	Adjustments
Step. 1	<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> <li>Maximize the DC level with the TRACKING control knob.</li> </ul> <p>pin 2 of DO-19 [A307]/MDM-3P(E-3)</p> <p>V sync</p> <p>ENVELOPE dc level</p>	
Step. 2	<ul style="list-style-type: none"> <li>PB PAUSE mode</li> </ul> <p>CH-1: pin 2 of DO-19 [A307]/MDM-3P(E-3) CH-2: TP307/MDM-3P(F-4)</p> <p>pin 2 of DO-19</p> <p>TP307</p> <p>DO PULSE</p> <p>A=1.10 V (Metal) A=1.0 V (Oxide)</p> <p>Metal: <input checked="" type="checkbox"/> RV621/DO-19[A307](E-3) Oxide: <input checked="" type="checkbox"/> RV620/DO-19[A307](E-3)</p>	
Step. 3	<ul style="list-style-type: none"> <li>Check that no white noise appears near the guard band on a monitor.</li> </ul>	
Step. 4	<ul style="list-style-type: none"> <li>Play back the dropout check signal on the alignment tape CR5-1B PS.</li> </ul> <p>Check that the dropout portion is compensated on the monitor.</p>	

### 11-1-12. C D.O.C Sensitivity Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1	<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> <li>Maximize the DC level with the TRACKING control knob.</li> </ul> <p>pin 5 of DO-19 [A307]/MDM-3P(E-3)</p> <p>V sync</p> <p>ENVELOPE dc level</p>	
Step. 2	<ul style="list-style-type: none"> <li>PB PAUSE mode</li> </ul> <p>CH-1: pin 5 of DO-19/MDM-3P(E-3) CH-2: TP407/MDM-3P(C-1)</p> <p>pin 5 of DO-19</p> <p>TP407</p> <p>5 Vdc</p> <p>0 Vdc</p> <p>A = 0.85 V</p> <p>ENVELOPE</p> <p>DO PULSE</p> <p>RV624/DO-19[A307](E-2)</p>	
Step. 3	<ul style="list-style-type: none"> <li>Check that no white noise appears near the guard band on a monitor.</li> </ul>	
Step. 4	<ul style="list-style-type: none"> <li>Play back the dropout check signal on the alignment tape CR5-1B PS.</li> </ul> <p>Check that the dropout portion is compensated on the monitor.</p>	

### 11-1-13. Y CCD Bias Adjustment

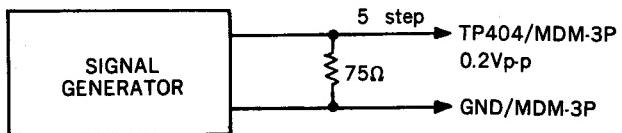
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Remove the solder bridge from SL1 on the MDM-3P Board(G-1).</li> <li>Supply 5-step signal to TP304 on the MDM-3P Board(G-1).</li> <li>Waveform monitor: DIFF'D STEP mode</li> <li>PLAY mode (without inserting a cassette tape)</li> <li>After the adjustment, solder SL1 to the former position.</li> </ul>	TP305/MDM-3P(G-4) <p>The waveform shows a series of pulses. A vertical line labeled 'A' indicates the amplitude of the pulses. A horizontal double-headed arrow below the waveform indicates a 100% amplitude range.</p> <p style="text-align: center;"><math>A \leq 4\%</math> (Flat or the amplitude is decreased to the right)</p>	RV610/DL-13[A306](F-4)

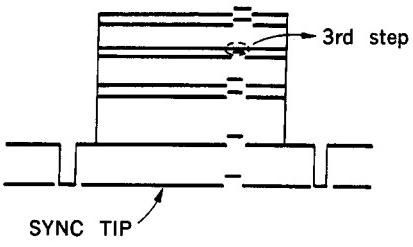
### 11-1-14. C CCD Bias Adjustment

[Connection]

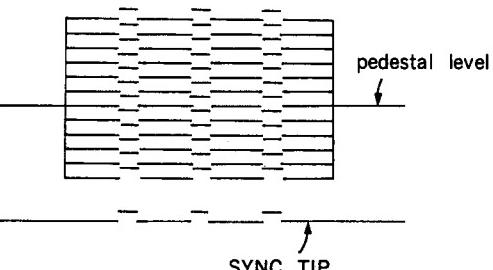


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Remove the SL2 on the MDM-3P Board(A-1).</li> <li>Supply 5-step signal to TP404 on the MDM-3P Board (A-1).</li> <li>Waveform monitor: DIFF'D STEP mode</li> <li>PLAY mode (without inserting a cassette tape)</li> <li>After the adjustment, solder the SL2 to the former position.</li> </ul>	TP405/MDM-3P(C-1) <p>The waveform shows a series of pulses. A vertical line labeled 'A' indicates the amplitude of the pulses. A horizontal double-headed arrow below the waveform indicates a 100% amplitude range.</p> <p style="text-align: center;"><math>A \leq 4\%</math> (Flat or the amplitude is decreased to the right)</p>	RV610/DL-13[A406](D-2)

### 11-1-15. Y D.O.C Replacement Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back dropout check signal on the alignment tape CR5-1B PS.</li> </ul>	TP306/MDM-3P(F-4)  Spec. 1 Adjust the sync tip level. Spec. 2 Adjust the 3rd step at the dropout portion. TRIG: TP44/SV-94P(J-1)	Spec. 1 • RV303/MDM-3P(G-3) Spec. 2 • RV304/MDM-3P(C-4)

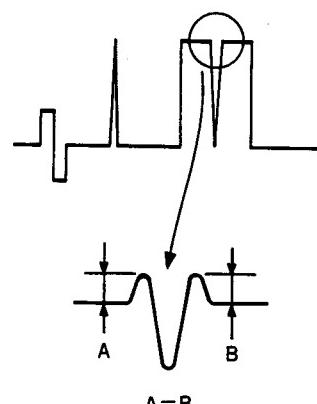
### 11-1-16. C D.O.C Replacement Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back dropout check signal on the alignment tape CR5-1B PS.</li> </ul>	TP406/MDM-3P(E-4)  Spec. 1 Adjust the sync tip level Spec. 2 Adjust the pedestal level TRIG: TP44/SV-94P(J-1)	Spec. 1 • RV403/MDM-3P(C-1) Spec. 2 • RV404/MDM-3P(D-1)

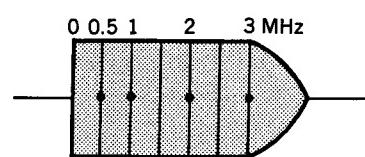
### 11-1-17. Y PB Frequency Response Adjustment (Metal)

Machine conditions for adjustment	Specifications	Adjustments														
<ul style="list-style-type: none"> <li>Play back the gated sweep (CTDM) signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP306/MDM-3P(F-4) Spec. 1</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.5 MHz</td> <td>100% (reference)</td> </tr> <tr> <td>1 MHz</td> <td>100±5 %</td> </tr> <tr> <td>2 MHz</td> <td>100±5 %</td> </tr> <tr> <td>3 MHz</td> <td>100±5 %</td> </tr> <tr> <td>4 MHz</td> <td>100±5 %</td> </tr> <tr> <td>5 MHz</td> <td>100±5 %</td> </tr> </tbody> </table> <p>Read in the center of moire</p> <p>Spec. 2</p> <p>The difference between the CH-A and CH-B should be within 5 % at 5MHz.</p> <p>TRIG: TP308/MDM-3P(F-3)</p> <p>[NOTE]</p> <p>When the carrier balance is generated between the CH-A and CH-B, perform section 11-1-7: Y carrier balance adjustment.</p>	Frequency	Level	0.5 MHz	100% (reference)	1 MHz	100±5 %	2 MHz	100±5 %	3 MHz	100±5 %	4 MHz	100±5 %	5 MHz	100±5 %	CH-A: <input checked="" type="checkbox"/> RV605/EQ-14[A303](F-3) CH-B: <input checked="" type="checkbox"/> RV606/EQ-14[A303](F-3)
Frequency	Level															
0.5 MHz	100% (reference)															
1 MHz	100±5 %															
2 MHz	100±5 %															
3 MHz	100±5 %															
4 MHz	100±5 %															
5 MHz	100±5 %															

### 11-1-18. Y Equalizer Adjustment

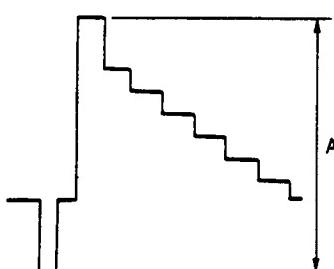
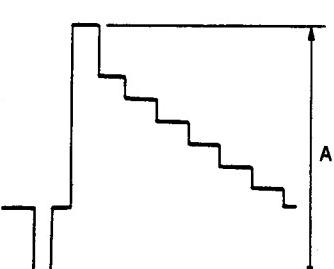
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the Pulse/bar (CTDM) signal on the alignment tape CR5-1B PS.</li> </ul>	TP306/MDM-3P(F-4) 	• RV619/FL-66

### 11-1-19. C PB Frequency Response Adjustment (Metal)

Machine conditions for adjustment	Specifications	Adjustments										
<ul style="list-style-type: none"> <li>Play back the gated sweep (CTDM) signal on the alignment tape CR5-1B PS.</li> </ul>	TP406/MDM-3P(E-4) Spec. 1  <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.5 MHz</td> <td>100% (reference)</td> </tr> <tr> <td>1 MHz</td> <td>100±5 %</td> </tr> <tr> <td>2 MHz</td> <td>100±5 %</td> </tr> <tr> <td>3 MHz</td> <td>95±10 %</td> </tr> </tbody> </table> <p>Read in the center of moire.</p> <p>Spec. 2</p> <p>The difference between the CH-A and CH-B should be within 5% at 3MHz.</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	Frequency	Level	0.5 MHz	100% (reference)	1 MHz	100±5 %	2 MHz	100±5 %	3 MHz	95±10 %	CH-A: • RV605/EQ-14A[A403](E-3) CH-B: • RV606/EQ-14A[A403](E-3)
Frequency	Level											
0.5 MHz	100% (reference)											
1 MHz	100±5 %											
2 MHz	100±5 %											
3 MHz	95±10 %											

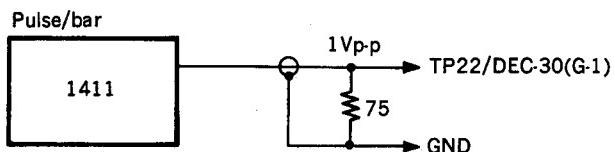
## 11-2. DEC BOARD ALIGNMENT

### 11-2-1. Y Noise Canceller Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1  • Play back the color bar signal on the alignment tape CR5-1B PS.	TP22/DEC-30(G-1)   $A = 1.0 \pm 0.02 \text{ V}$	• RV101/ENC-6P(G-4)
Step. 2  • Play back the color bar signal on the alignment tape CR5-1B PS.	VIDEO OUT connector (terminated at 75 ohms)   $A = 1.0 \pm 0.02 \text{ Vp-p}$	• RV201/DEC-30(G-1)

Step 3.

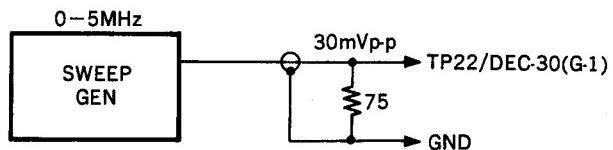
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Insert the alignment tape CR5-1B PS, and then put the unit into the PB mode.</li> <li>Disconnect CN2 on the DEC-30 Board.</li> </ul>	TP25/DEC-30(G-1)  Make flat the center of the noise.	• RV203/DEC-30(G-3)

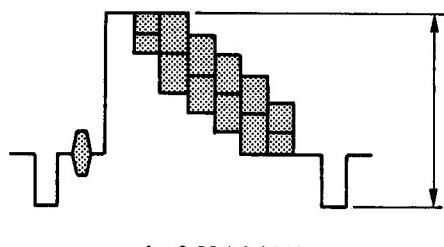
Step 4.

[Connection]

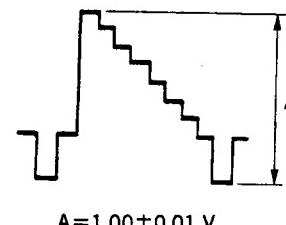
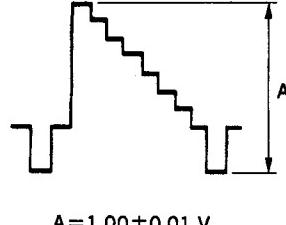


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Insert the alignment tape CR5-1B PS, and then put the unit into the PB mode.</li> <li>After the adjustment, connect CN2 on the DEC-30 Board.</li> </ul>	TP23/DEC-30(G-1)  Adjust as the above illustration.	• RV202/DEC-30(G-1)

### 11-2-2. DEC Input Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Turn RV503 on the DEC-30 Board (F-2) fully counterclockwise direction.</li> <li>Set the VIDEO LEVEL VR knob to the center clicked position.</li> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> </ul>	TP1/DEC-30(E-4)  A = 0.63 ± 0.01 V	RV2/BF-29

### 11-2-3. Y Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1 <ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (100-100-0)</li> <li>EE mode</li> </ul>	TP9/DEC-30(C-4)  A = 1.00 ± 0.01 V	RV504/DEC-30(E-2)
Step. 2 <ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal (100% White)</li> <li>EE mode</li> </ul>	TP9/DEC-30(C-4)  A = 1.00 ± 0.01 V	RV508/DEC-30(C-4)

#### 11-2-4. 4.5MHz Trap Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Turn RV503 on the DEC-30 Board (F-2) fully counterclockwise direction.</li> <li>VIDEO IN: H sweep signal</li> <li>EE mode</li> </ul>	TP9/DEC-30(C-4) <p style="text-align: center;">A : B = 4 : 3±0.2</p>	<input checked="" type="checkbox"/> LV501/DEC-30(F-4)

#### 11-2-5. Phase Equalizer Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: pulse/bar signal</li> <li>EE mode</li> </ul>	TP9/DEC-30(C-4) <p style="text-align: center;">Minimize the level. A=B</p>	<input checked="" type="checkbox"/> RV501/DEC-30(F-3) <input checked="" type="checkbox"/> RV502/DEC-30(F-3)

### 11-2-6. Chroma Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (100-100-0)</li> <li>EE mode</li> </ul>	<p>TP6/DEC-30(G-1)</p> <p>A = <math>1.00 \pm 0.01</math> V</p>	RV301/DEC-30(F-2)

### 11-2-7. Sampling Pulse Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> </ul>	<p>CH-1: TP9/DEC-30(C-4) CH-2: TP16/DEC-30(B-2)</p> <p>A = <math>6.0 \pm 0.1 \mu\text{sec}</math></p> <p>TRIG: TP1/DEC-30(E-4)</p>	RV604/DEC-30(B-4)

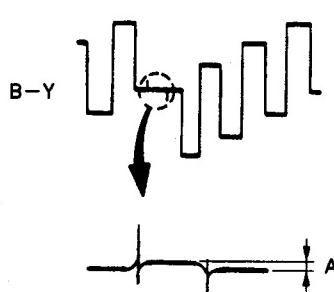
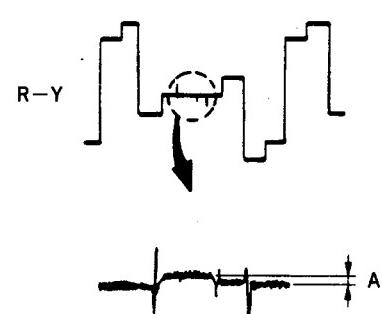
### 11-2-8. Blanking Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO IN : color bar signal</li> <li>• EE mode</li> </ul>	<p>CH-1 : TP9/DEC-30(C-4) CH-2 : TP11/DEC-30(D-3)</p> <p>TP9</p> <p>TP11</p> <p>A</p> <p><math>A = 9.8 +0.1 \mu\text{sec}</math></p>	• RV603/DEC-30(B-4)

### 11-2-9. DEC HUE Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN : color bar signal (100-100-0)</li> <li>EE mode</li> </ul>	<p>CH-1 : TP11/DEC-30(D-3) CH-2 : TP13/DEC-30(D-3)</p> <p>TP11 B-Y</p> <p>TP13 R-Y</p> <p>Minimize A</p> <p>TRIG: TP14/DEC-30(C-4)</p>	<input checked="" type="checkbox"/> RV602/DEC-30(B-1)

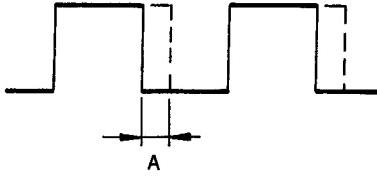
### 11-2-10. Blanking Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO IN : color bar signal</li> <li>• EE mode</li> </ul>	<p>TP11/DEC-30(D-3)</p>  <p>A = <math>0 \pm 4</math> mV</p> <p>TRIG: TP14/DEC-30(C-4)</p>	• RV606/DEC-30(D-2)
	<p>TP13/DEC-30(D-3)</p>  <p>A = <math>0 \pm 4</math> mV</p> <p>TRIG: TP14/DEC-30(C-4)</p>	• RV607/DEC-30(C-3)

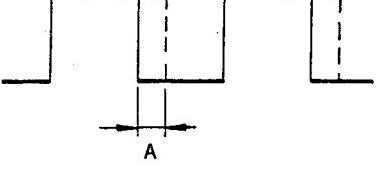
### 11-3. CEC BOARD ALIGNMENT

#### 11-3-1. Chroma AFC 1/8 Clock Adjustment

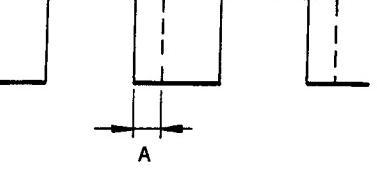
Step. 1

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1A PS.</li> </ul>	TP504/CEC-3P(B-3)  Minimize the clock deflection. $A=0 \pm 20 \text{ nsec}$	RV503/CEC-3P(A-3)

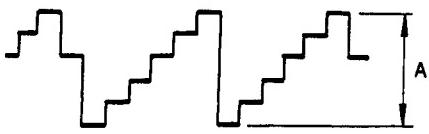
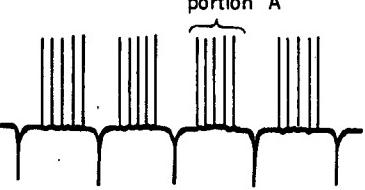
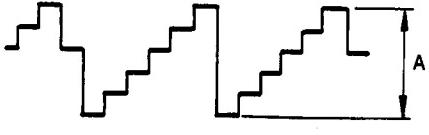
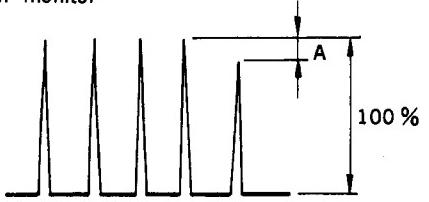
Step. 2

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> </ul>	TP504/CEC-3P(B-3)  Minimize the clock deflection. $A=0 \pm 20 \text{ nsec}$	RV506/CEC-3P(A-1)

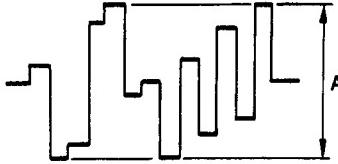
#### 11-3-2. Y AFC 1/8 Clock Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1A PS.</li> </ul>	TP505/CEC-3P(B-3)  Minimize the clock deflection. $A=0 \pm 20 \text{ nsec}$	RV505/CEC-3P(A-3)

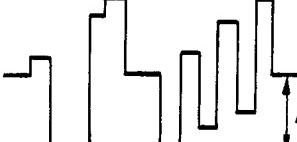
### 11-3-3. Expand/Compress CCD Linearity Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 5-step signal</li> <li>EE mode</li> <li>Waveform monitor: DIFFD STEP mode</li> </ul>	pin 31 of CN1/CEC-3P(C-4)  Spec 1. $A = 0.46 \pm 0.01V$ TRIG: TP152/CEC-3P(D-3)	Spec 1: Step 1. •RV11/DL-15[A152](C-1) Step 2. •RV11/DL-15[A153](A-1) Step 3. •RV21/DL-15[A152](B-1) Step 4. •RV21/DL-15[A153](B-1)
<ul style="list-style-type: none"> <li>Turn the RVs on the DL-15 Board [A152 through A155] fully counterclockwise direction.</li> </ul>	pin 31 of CN1/CEC-3P(C-4) waveform monitor  Spec 2. Make portion A flat.	Spec 2: Step 1. •RV12/DL-15[A152](C-1) Step 2. •RV12/DL-15[A153](A-1) Step 3. •RV22/DL-15[A152](B-1) Step 4. •RV22/DL-15[A153](B-1)
	pin 31 of CN1/CEC-3P(C-4)  Spec 3. $A = 0.93 \pm 0.01V$	Spec 3.: Step 1. •RV11/DL-15[A154](C-1) Step 2. •RV11/DL-15[A155](A-2) Step 3. •RV21/DL-15[A154](B-1) Step 4. •RV21/DL-15[A155](B-2)
	pin 31 of CN1/CEC-3P(C-4) waveform monitor  Spec 4. $A = 0 \pm 2\%$	Spec 4: Step 1. •RV12/DL-15[A154](C-1) Step 2. •RV12/DL-15[A155](A-2) Step 3. •RV22/DL-15[A154](B-1) Step 4. •RV22/DL-15[A155](B-2)

#### 11-3-4. Expand/Compress CCD Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> </ul>	<p>pin 31 of CN1/CEC-3P(C-4)</p>  <p>A = 0.93 ± 0.01V</p> <p>TRIG: TP152/CEC-3P(D-3)</p>	<ul style="list-style-type: none"> <li>RV11/DL-15[A154](C-1)</li> <li>RV21/DL-15[A154](B-1)</li> <li>RV11/DL-15[A155](B-2)</li> <li>RV21/DL-15[A155](A-2)</li> </ul>

#### 11-3-5. Chroma Limiter Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (chroma: +6dB)</li> <li>EE mode</li> </ul>	<p>pin 31 of CN1/CEC-3P(C-4)</p>  <p>A = 0.62 ± 0.01 V</p>	<ul style="list-style-type: none"> <li>RV1/LM-16(E-2)</li> </ul>

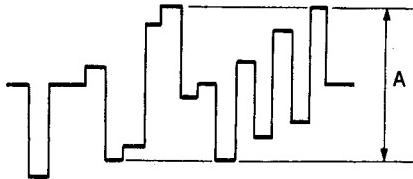
### 11-3-6. CTDM Compress Start Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> </ul>	<p>CH-1: TP132/ENC-6P(G-2) CH-2 : TP7/CEC-3P(E-4)</p> <p>TP132</p> <p>TP7</p> <p>TP132</p> <p>TP7</p> <p>50%</p> <p>50%</p> <p>A</p> <p><math>A = 2.85 \pm 0.05 \mu\text{s}</math></p>	• RV502/CEC-3P(B-3)

### 11-3-7. Pre $\phi$ CCD Linearity Adjustment

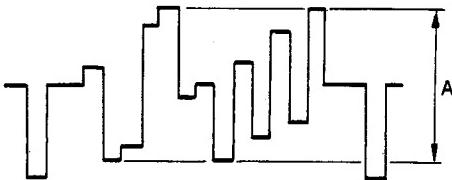
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Remove the solder bridge from the slit on the DUS-252 Board.</li> <li>Play back the C Linearity signal on the alignment tape CR5-1B PS.</li> <li>Waveform monitor: DIFF'D STEP mode</li> <li>After the adjustment, solder the slit to the former position.</li> </ul>	<p>TP1/CEC-3P(G-2)</p> <p>TP1</p> <p>100 %</p> <p>A</p> <p><math>A = 0 \pm 3\%</math></p>	• RV1/DL-14[A101](E-4)

### 11-3-8. Pre $\phi$ CCD Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP1/CEC-3P(G-2)  $A = 0.93 \pm 0.01V$	• RV2/CEC-3P(G-3)

### 11-3-9. C Nonlinear De-emphasis Adjustment

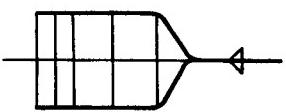
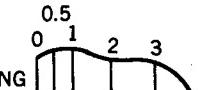
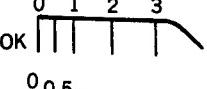
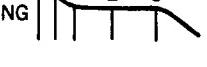
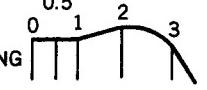
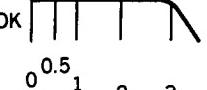
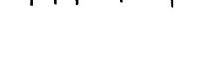
Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP2/CEC-3P(F-2)  $A = 0.93 \pm 0.01V$	• RV1/NR-18(G-4)

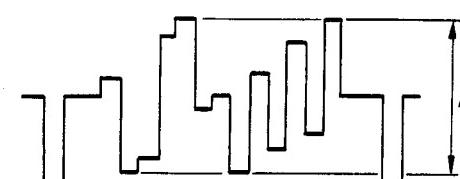
Step 2.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> <li>Turn RV4 on the NR-18 Board (G-4) to the mechanical center position.</li> </ul>	TP15/NR-18(G-4)  $A = B$	• RV3/NR-18(G-4)

Step 3.

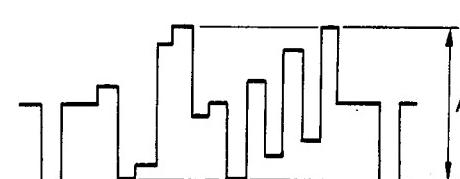
Machine conditions for adjustment	Specifications	Adjustments												
<ul style="list-style-type: none"> <li>Play back the gated sweep signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP2/CEC-3P(F-2)</p>     <p>Make flat low-pass frequency response (0 through 1 MHz).</p>    <p>Adjust high-pass frequency response (1 through 3 MHz) to meet the specification.</p> <table border="1"> <thead> <tr> <th>frequency</th> <th>level</th> </tr> </thead> <tbody> <tr> <td colspan="2">left edge (Ref)</td> </tr> <tr> <td>0.5 MHz</td> <td>100±5%</td> </tr> <tr> <td>1 MHz</td> <td>100±5%</td> </tr> <tr> <td>2 MHz</td> <td>100±5%</td> </tr> <tr> <td>3 MHz</td> <td>95±5%</td> </tr> </tbody> </table>	frequency	level	left edge (Ref)		0.5 MHz	100±5%	1 MHz	100±5%	2 MHz	100±5%	3 MHz	95±5%	<p>• RV4/NR-18(G-4)</p> <p>• RV2/NR-18(G-4)</p> <ul style="list-style-type: none"> <li>Alternately adjust RV4 and RV2 so that the frequency response meet the specification.</li> </ul>
frequency	level													
left edge (Ref)														
0.5 MHz	100±5%													
1 MHz	100±5%													
2 MHz	100±5%													
3 MHz	95±5%													

Step 4.

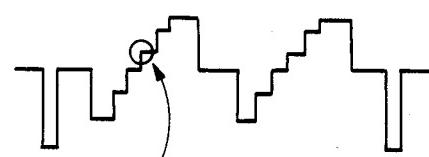
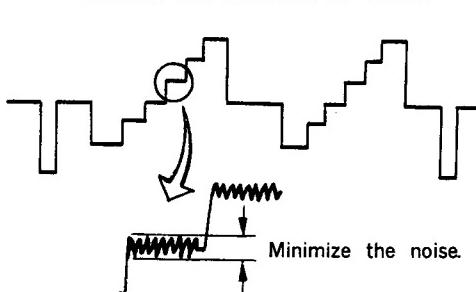
Machine conditions for adjustment	Specifications	Adjustments
• Playback the color bar signal on the alignment tape CR5-1B PS.	TP2/CEC-3P(F-2)  $A = 0.93 \pm 0.01V$	• RV1/NR-18(G-4)

### 11-3-10. C Noise Canceller Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
• Play back the color bar signal on the alignment tape CR5-1A PS.	TP2/CEC-3P(F-2)  $A = 0.7 \pm 0.01V$	• RV5/NR-18(G-4)

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
• Play back the C Linearity signal portion on the align- ment tape CR5-1A PS.	TP2/CEC-3P(F-2)  Minimize the overshoot or smear.   Minimize the noise.	• RV7/NR-18(G-4) • RV6/NR-18(G-4)  • Alternately adjust RV6 and RV7 to meet the specifica- tion.

### 11-3-11. Pre $\phi$ C SH Adjustment

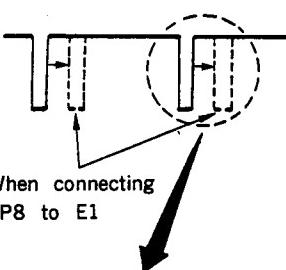
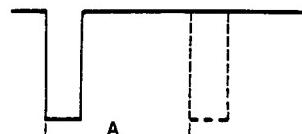
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	<p>CH-1: TP2/CEC-3P(F-2) CH-2: TP7/CEC-3P(E-4)</p> <p>A = <math>2.30 \pm 0.05 \mu\text{sec}</math></p>	• RV501/CEC-3P(A-1)

### 11-3-12. Pre $\phi$ Y SH Adjustment

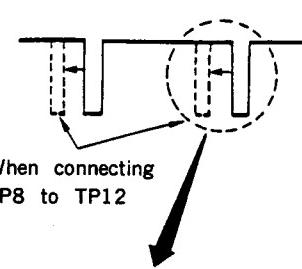
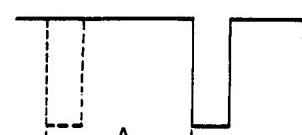
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	<p>CH-1: TP6/CEC-3P(E-4) CH-2: TP7/CEC-3P(E-4)</p> <p>A = <math>0.85 \pm 0.05 \mu\text{sec}</math> (center of jitter)</p>	• RV4/CEC-3P(F-3)

### 11-3-13. Pre $\phi$ Limiter Adjustment

Step 1.

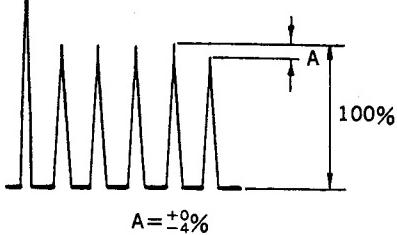
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect TP8 on the CEC-3P Board (G-4) to E1 on the CEC-3P Board (F-2) with a shorting clip.</li> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> <li>After the Adjustment, remove the shorting clip.</li> </ul>	TP7/CEC-3P(E-4)   $A = 16 \pm 2 \mu\text{sec}$ Read at the top of jitter. TRIG: TP6/CEC-3P(E-4)	RV2/LM-15[A105](E-3)

Step 2.

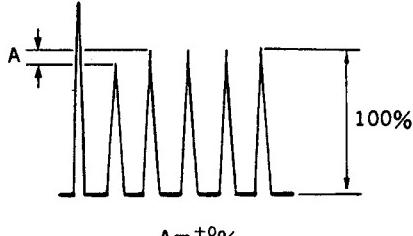
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect TP8 on the CEC-3P Board (G-4) to TP12 on the CEC-3P Board (E-4) with a shorting clip.</li> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> <li>After the adjustment, remove the shorting clip.</li> </ul>	TP7/CEC-3P(E-4)   $A = 16 \pm 2 \mu\text{sec}$ Read at the top of jitter. TRIG: TP6/CEC-3P(E-4)	RV1/LM-15[A105](E-3)

### 11-3-14. DUB CTDM Linearity Adjustment

Step 1.

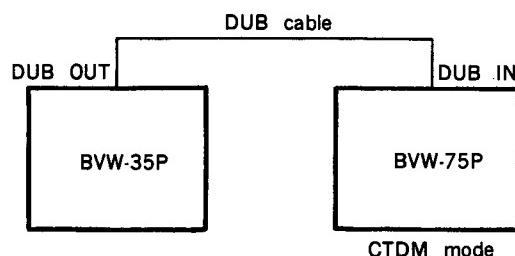
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Remove the solder bridge from the slit on the DUS-252 Board.</li> <li>Play back the C linearity signal on the alignment tape CR5-1B PS.</li> <li>Waveform monitor: DIFFD STEP mode</li> </ul>	TP3/CEC-3P(G-1) 	• RV1/DL-14[A103](G-1)

Step 2.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the C linearity signal on the alignment tape CR5-1B PS.</li> <li>Waveform monitor: DIFFD STEP mode</li> <li>After the adjustment, solder the slit to the former position.</li> </ul>	TP4/CEC-3P(F-2) 	• RV1/DL-14[A104] (G-1)

### 11-3-15. DUB CTDM Level Adjustment

[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> <li>After the adjustment, remove the DUB cable.</li> </ul>	TP5/CEC-3P(D-4)  $A = 0.62 \pm 0.01\text{V}$	<span style="color: red;">●</span> RV3/CEC-3P(G-2)

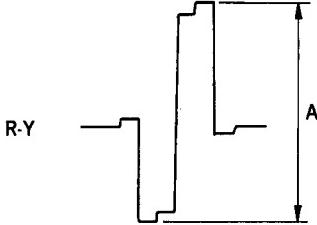
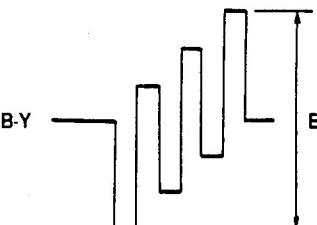
### 11-3-16. R-Y Comb CCD Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP11/CEC-3P(D-3)  Spec 1. Symmetrize the waveform. Spec 2. Minimize the level. $(A \leq 0.2\text{V})$ TRIG: TP13/CEC-3P(D-4)	Spec 1. <span style="color: red;">●</span> RV21/DL-17(C-4) Spec 2. <span style="color: red;">●</span> RV22/DL-17(C-4) <ul style="list-style-type: none"> <li>Alternately adjust until specification 2 is satisfied.</li> </ul>

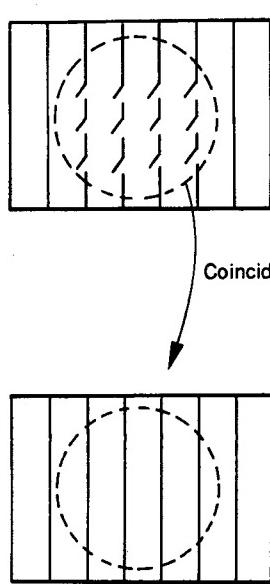
### 11-3-17. B-Y Comb CCD Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP10/CEC-3P(D-4)  <p style="text-align: center;">Spec 1. Symmetrize the waveform. Spec 2. Minimize the level. (<math>A \leq 0.2V</math>)</p> <p style="text-align: center;">TRIG: TP1/CEC-3P(G-2)</p>	Spec 1. <input checked="" type="radio"/> RV11/DL-17(C-2) Spec 2. <input checked="" type="radio"/> RV12/DL-17(C-2) <ul style="list-style-type: none"> <li>Alternately adjust until specification 2 is satisfied.</li> </ul>

### 11-3-18. Expanded Output Level Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Set S1 on the CEC-3P Board (G-3) to ON.</li> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP14/CEC-3P(E-4)  <p style="text-align: center;"><math>A = 0.70 \pm 0.05V</math></p>	<input checked="" type="radio"/> RV151/CEC-3P(B-2)
	TP13/CEC-3P(D-4)  <p style="text-align: center;"><math>B = 0.70 \pm 0.05V</math></p>	<input checked="" type="radio"/> RV152/CEC-3P(B-2)

### 11-3-19. Free-Run Timing Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar (DO) signal portion on the alignment tape CR5-1B PS.</li> <li>Turn the TRACKING control VR counterclockwise or clockwise direction to generate the chroma tearing by sync disturbance.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p>  <p>When turning the TRACKING control VR counterclockwise or clockwise direction, the chroma tearing by sync disturbance should not appear.      *Red or green noise may appear.      This noise is not related to this adjustment.</p>	• RV504/CEC-3P(A-2)

## 11-4. ENC BOARD ALIGNMENT

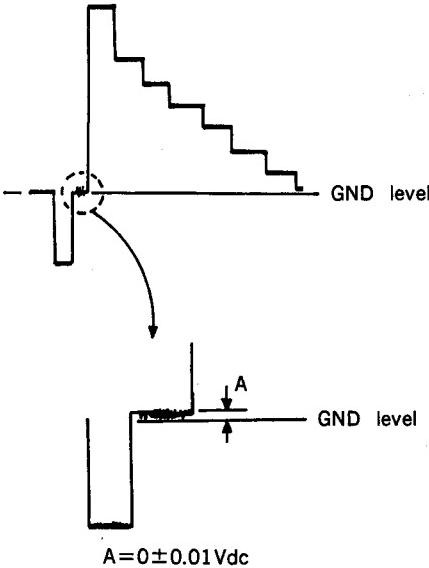
### 11-4-1. Y Pedestal Difference in Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>Waveform monitor</li> </ul>	<p>VIDEO OUT connector (terminated at 75ohms)</p>	• RV130/ENC-6P(H-2)

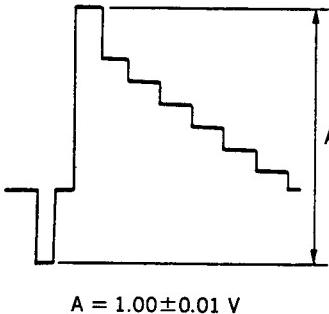
### 11-4-2. Y Sync Replacement Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>Set S1 on the ENC-6P Board(C-1) to ON.</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>Waveform monitor</li> <li>After the adjustment, set S1 on the ENC-6P Board (C-1)to OFF.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>Coincide side A with the V sync.</p>	• RV131/ENC-6P(G-2)

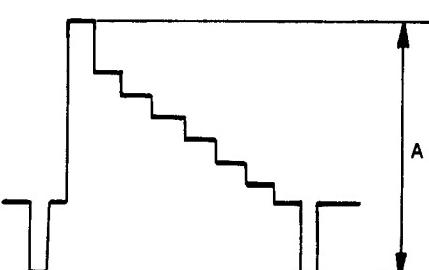
### 11-4-3. Y Pedestal Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>Set S1 on the ENC-6P Board (C-1) to ON.</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>After the adjustment, set S1 on the ENC-6P Board (C-1) to OFF.</li> </ul>	TP133/ENC-6P(F-1)  <p>A = 0 ± 0.01 Vdc</p>	RV137/ENC-6P(F-1)

### 11-4-4. Y EE Output Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>Set S1 on the ENC-6P Board (C-1) to ON.</li> <li>CAMERA IN: color bar signal (100% White)</li> <li>EE mode</li> <li>Waveform monitor</li> <li>After the adjustment, set S1 on the ENC-6P Board (C-1) to OFF.</li> </ul>	VIDEO OUT connector (terminated at 75 ohms)  <p>A = 1.00 ± 0.01 V</p>	RV134/ENC-6P(G-1)

#### 11-4-5. Y DUB Out Adjustment

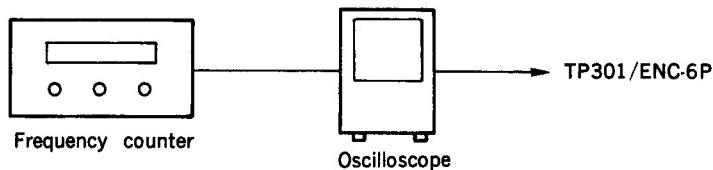
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect the DUB OUT to the DUB IN on the BVW-75P with a DUB cable.</li> <li>S1/ENC-6P(C-1): ON</li> </ul> <p>Step.1 PB mode</p> <ul style="list-style-type: none"> <li>BVW-75P : CTDM mode</li> <li>Play back the color bar signal on the alignment tape CR5-1B PS (Metal mode adj.) CR5-1A PS (Oxide mode adj.)</li> </ul> <p>Step.2 EE mode</p> <ul style="list-style-type: none"> <li>BVW-75P: Y-R, B mode</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: Color bar signal (100% WHITE)</li> <li>EE mode</li> <li>After the adjustment, set S1 on the ENC-6P Board (C-1) to OFF, and remove the DUB cable.</li> </ul>	TP402/ENC-6P(E-4)  <p>PB mode EE mode } A = 1.0±0.01V</p>	Step.1 Metal mode <input checked="" type="radio"/> RV411/ENC-6P(E-3) Oxide mode <input checked="" type="radio"/> RV100/ENC-6P(G-4) Step.2 <input checked="" type="radio"/> RV132/ENC-6P(G-2)

#### 11-4-6. SC Tuning Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> </ul>	TP301/ENC-6P(D-3)  <p>Maximize A (A ≈ 3 V)</p>	<input checked="" type="radio"/> LV321/ENC-6P(D-3)

### 11-4-7. 4.43MHz OSC Adjustment

#### [Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Wait for more than three minutes after the power is turned on.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>Frequency counter</li> </ul>	TP301/ENC-6P(D-3)  4.433619MHz±5 Hz	CV351/ENC-6P(C-2)

### 11-4-8. Clamp Pulse Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Waveform monitor</li> <li>EE mode</li> <li>Wait for more than one minute and thirty seconds after the EE mode.</li> </ul>	CH-1: TP501/ENC6P(C-3) CH-2: TP506/ENC-6P(A-4)  <p>A</p> <p>A=8.1±0.05μs</p>	RV504/ENC-6P(A-4)

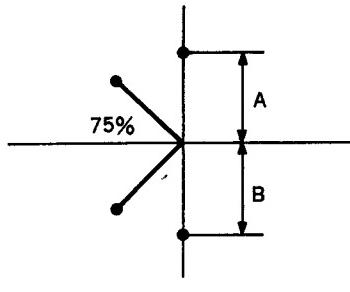
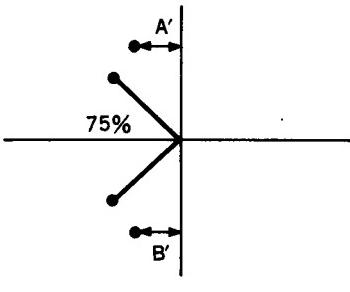
#### 11-4-9. Chroma Blanking Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• Waveform monitor</li> <li>• EE mode</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p>	<p>B-Y(H axis) ● RV202/ENC-6P(F-3)</p> <p>R-Y(V axis) ● RV242/ENC-6P(F-3)</p> <p>• Alternately adjust</p>

#### 11-4-10. Chroma Carrier Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• Waveform monitor</li> <li>• EE mode</li> <li>• Wait for more than one minute and thirty seconds after the EE mode.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p>	<p>● RV201/ENC-6P(F-3) ● RV241/ENC-6P(F-3)</p> <p>• Alternately adjust.</p>

### 11-4-11. Chroma Balance Vertical Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: PHASE-90(P-90)</li> <li>• EE mode</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms.)</p> <p>When the luminescent spot is in the vertical line vectorscope</p>  <p><math>A = B</math></p> <p>When the luminescent spot is in the horizontal line vectorscope</p>  <p><math>A' = B'</math></p>	◎RV302/ENC-6P(D-2)

#### 11-4-12. Chroma Balance Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• EE mode</li> <li>• Set the vectorscope gain to UNCAL, and adjust so that R and C<sub>y</sub> are located in "田".</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>Luminescent spots on vectorscope</p> <p>○ : OK ● : NG</p> <p>Repeat until twelve luminescent spots satisfy the specification.</p>	<p>● RV203/ENC-6P(F-2)</p>

#### 11-4-13. Burst Balance/Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• EE mode</li> <li>• Set the vectorscope gain to UNCAL, and adjust so that the 12 luminescent spots are located in "田".</li> <li>• After the adjustment, set the vectorscope gain to CAL.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>vectorscope</p> <p>75%</p> <p>○ : OK ● : NG</p> <p>Balance Adj :The burst level should be same. Level Adj :Place the luminescent spot of burst at 75% position on the BURST axis.</p>	<p>Balance</p> <p>● RV243/ENC-6P(F-2)</p> <p>Level</p> <p>● RV301/ENC-6P(D-3)</p>

#### 11-4-14. Chroma Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• EE mode</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>vectorscope Burst's luminescent spot: 75%</p> <p>75%</p> <p>Twelve luminescent spots should be located in "■".</p>	• RV135/ENC-6P(F-1)

#### 11-4-15. Video Out Y/C Delay Adjustment

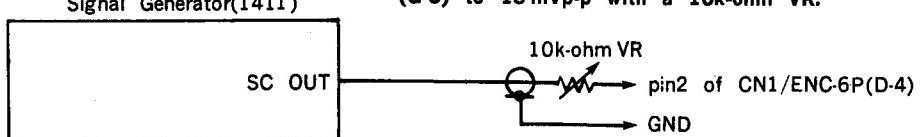
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: pulse/bar signal</li> <li>• EE mode</li> <li>• Set the line selector in the waveform monitor to OFF.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>The peak is located in the center.</p> <p>Spec.1</p> <p>[NOTE] Check that the specifications 1 and 2 are satisfied on condition that each video board is directly connected to the main unit without an EX-150 extension board.</p>	<p>• RV133/ENC-6P(G-2)</p> <p>When the peak is not satisfied the specification.</p> <p>DL101/ENC-6P(H-2) soldering side</p> <p>• Adjust with RV133 changing the tap.</p>

### 11-4-16. SC Leak Cancel Adjustment

#### [Connection]

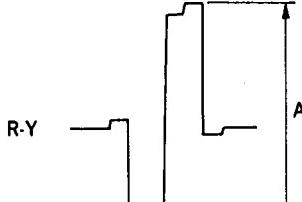
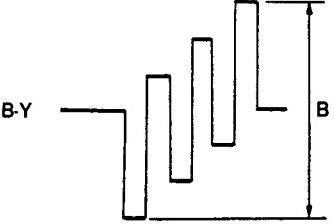
\*Adjust the SC leak of TP131 on the ENC-6P Board

(G-3) to 18 mVp-p with a 10k-ohm VR.

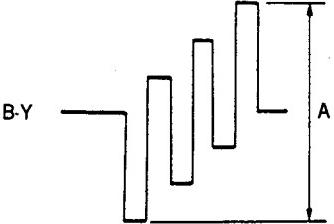


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Set S1 on the ENC-6P Board (C-1) to ON.</li> <li>EE mode</li> <li>Waveform monitor</li> <li>After the adjustment, set S1 on the ENC-6P Board (C-1) to OFF.</li> </ul>	VIDEO OUT connector (terminated at 75 ohms)  <span style="color: black;">■</span> : SC leak Minimize the SC leak level	level adjustment <span style="color: black;">●</span> RV136/ENC-6P(F-1) phase adjustment <span style="color: black;">●</span> RV138/ENC-6P(F-1)

#### 11-4-17. Chroma DUB Out Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Connect DUB OUT to DUB IN on the BVW-75P with DUB cable.</li> <li>• VIDEO SW: CAMERA</li> <li>• BVW-75P: Y-R, B mode</li> <li>• CAMERA IN: color bar signal</li> <li>• EE mode</li> </ul>	TP404/ENC-6P(E-4)  A = 0.70±0.01 V	R-Y <span style="color: red;">●</span> RV431/ENC-6P(E-3)
	TP403/ENC-6P(E-4)  B = 0.70±0.01 V	B-Y <span style="color: red;">●</span> RV421/ENC-6P(E-3)

#### 11-4-18. B-Y Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO IN : color bar signal (100-100-0)</li> <li>• EE mode</li> </ul>	TP11/DEC-30(C-3) TP403/ENC-6P(E-4)  A=0.70±0.01 V	<span style="color: red;">●</span> RV610/DEC-30(D-2)

#### 11-4-19. R-Y Level Adjustment

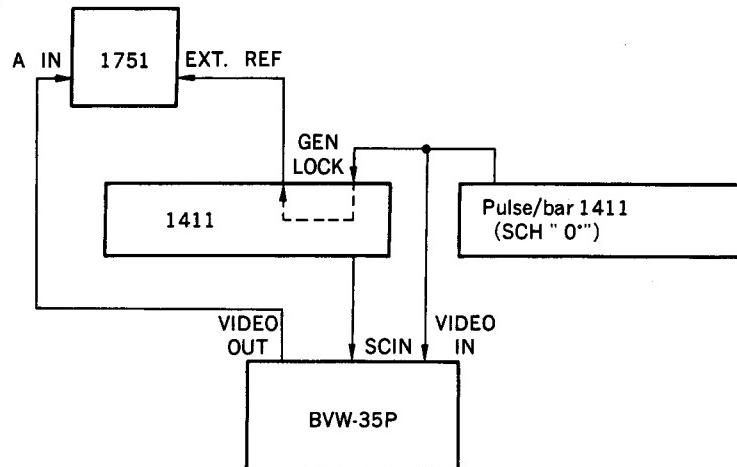
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (100-100-0)</li> <li>EE mode</li> </ul>	<p>TP13/DEC-30(C-3) TP404/ENC-6P(E-4)</p> <p><math>A = 0.70 \pm 0.01 \text{ Vp-p}</math></p>	• RV601/DEC-30(C-1)

#### 11-4-20. CC Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal (REVERSE)</li> <li>EE mode</li> </ul>	<p>VIDEO OUT connector(terminated at 75ohms)</p> <p>Vectorscope</p> <p>Points A and B should correspond to the V axis.</p>	• RV611/DEC-30(C-2)

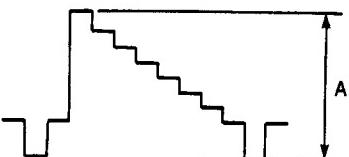
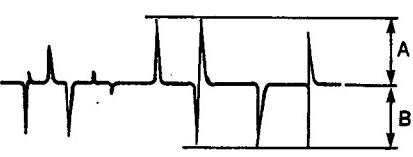
### 11-4-21. Composite Y/C Delay Adjustment

#### [Connection]

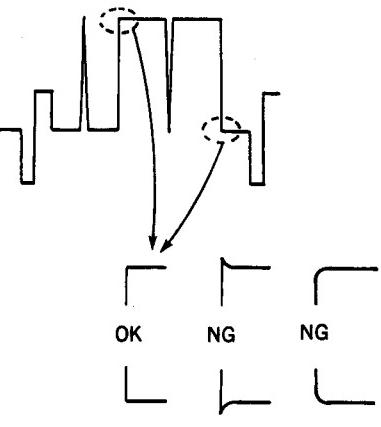


Machine conditions for adjustment	Specifications	Adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>• TBC SW: ON</li> <li>• VIDEO IN: pulse/bar signal</li> <li>• EE mode</li> <li>• 1751: SCH mode</li> </ul>	<p>BURST phase <math>0\pm 5</math> degrees (against the sync)</p>	SC dial/1411
<p>Step. 2</p> <ul style="list-style-type: none"> <li>• TBC SW: ON</li> <li>• VIDEO IN: pulse/bar signal</li> <li>• EE mode</li> <li>• 1751: WFM mode</li> </ul>	<p>VIDEO OUT connector(terminated at 75ohms)</p> <p>MOD 10T portion</p> <p>OK</p> <p>NG NG</p> <p><math>(0\pm 5\text{nsec})</math></p> <p>[NOTE] Check that the specification 1 and 2 are satisfied on condition that each video board is directly connected to the main unit without an extension board.</p>	<p>RV503/DEC-30(C-2)</p> <ul style="list-style-type: none"> <li>• When the specification is not satisfied, adjust again changing the tap of DL-3 on the DEC-30 Board.</li> </ul> <p>soldering side</p>

### 11-4-22. Y Nonlinear De-emphasis Adjustment

Machine conditions for adjustment	Specifications	Adjustments
Step. 1  <ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP131/ENC-6P(G-3)   $A = 1.0 \pm 0.01 \text{ V}$	RV101/ENC-6P(F-4)
Step. 2  <ul style="list-style-type: none"> <li>Play back the pulse/bar signal on the alignment tape CR5-1B PS.</li> </ul>	TP101/ENC-6P(G-4)   $A = B$	RV102/ENC-6P(G-4)

Machine conditions for adjustment	Specifications	Adjustments														
<p>Step. 3</p> <ul style="list-style-type: none"> <li>Play back the gated sweep signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP131/ENC-6P(G-3)</p> <p>Make flat the frequency response in low frequency level (0 through 1 MHz).</p> <p>Adjust the high frequency level. (2 through 4 MHz)</p> <table border="1"> <thead> <tr> <th>frequency</th> <th>level</th> </tr> </thead> <tbody> <tr> <td>0.5 MHz</td> <td>100%(reference)</td> </tr> <tr> <td>1 MHz</td> <td>100±4 %</td> </tr> <tr> <td>2 MHz</td> <td>100±6 %</td> </tr> <tr> <td>3 MHz</td> <td>100±6 %</td> </tr> <tr> <td>4 MHz</td> <td>100±6 %</td> </tr> <tr> <td>5 MHz</td> <td>100±6 %</td> </tr> </tbody> </table>	frequency	level	0.5 MHz	100%(reference)	1 MHz	100±4 %	2 MHz	100±6 %	3 MHz	100±6 %	4 MHz	100±6 %	5 MHz	100±6 %	<p>• RV103/ENC-6P(G-4)</p> <p>• RV104/ENC-6P(F-4)</p> <ul style="list-style-type: none"> <li>Alternately adjust RV103 and RV104 to meet the specification.</li> </ul>
frequency	level															
0.5 MHz	100%(reference)															
1 MHz	100±4 %															
2 MHz	100±6 %															
3 MHz	100±6 %															
4 MHz	100±6 %															
5 MHz	100±6 %															

Machine conditions for adjustment	Specifications	Adjustments
<p>Step.4</p> <ul style="list-style-type: none"> <li>Play back the pulse/bar signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP131/ENC-6P(G-3)</p>  <p>Check the waveform. When the specification is not satisfied, perform step 2 and 3 again.</p>	

### 11-4-23. PB Y/C Delay Adjustment

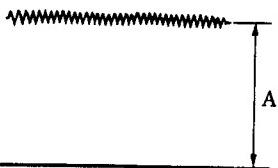
Machine conditions for adjustment	Specifications	Adjustments
• Play back the LINE 17 signal on the alignment tape CR5-1B PS.	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>The peak should be located in the center.</p>	
• Set the line selector on the waveform monitor to OFF.	<p>Spec. 1</p> <p><math>0 \pm 10 \text{ nsec}</math></p>	RV501/ENC-6P(A-2)
• Set the line selector on the waveform monitor to 15 LINE, and FIELD switch to 1+3 and 2+4.	<p>Spec. 2 Difference between fields</p> <p><math>0 \pm 20 \text{ nsec}</math></p> <p>CH-A: 1+3, CH-B: 2+4</p>	

[ NOTE ] Check that the specification 1 and 2 are satisfied on condition that each video board is directly connected to the main unit without an extension board.

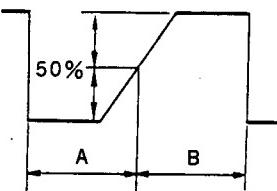
### 11-4-24. False H Sync Frequency Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• Play back the color bar signal on the alignment tape CR5-1A PS.	<p>TP505/ENC-6P(C-4)</p> <p><math>A = 68 \pm 1 \mu\text{sec}</math></p>	RV503/ENC-6P(A-2)

#### 11-4-25. H-AFC Error Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal • EE mode	TP503/ENC-6P(A-2)  $A = 2.5 \pm 0.1 \text{ Vdc}$	• LV551/ENC-6P(A-3)

#### 11-4-26. H-AFC VCO Duty Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• VIDEO IN: color bar signal • EE mode	TP504/ENC-6P(B-3)  $A : B = 50 : 50 \pm 2$	• RV502/ENC-6P(A-4)

#### 11-4-27. PB DUB OUT Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the color bar signal on the alignment tape CR5-1B PS.</li> </ul>	<p>DUB OUT connector (terminated at 75 ohms)</p> <p>R-Y</p> <p>A = 0.70±0.01 V</p> <p>B-Y</p> <p>B = 0.70±0.01 V</p>	<p>• RV151/CEC-3P(B-2)</p> <p>• RV152/CEC-3P(B-2)</p>

#### 11-4-28. Video Out Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>A = 1.0±0.01 V</p>	<p>• RV504/DEC-30(E-2)</p>

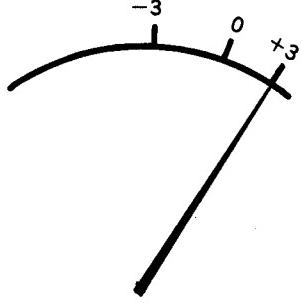
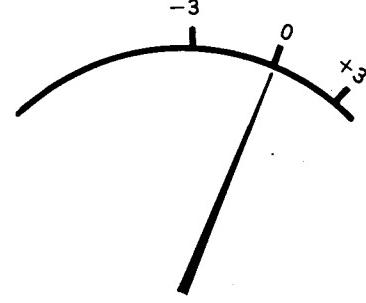
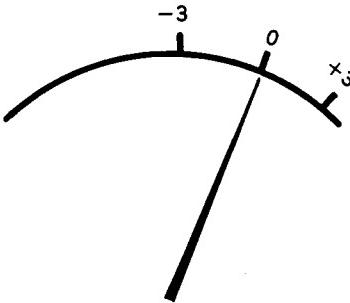
#### 11-4-29. DEC Vector Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms) vectorscope</p> <p>Each spot should be located in each smaller frame.</p>	<ul style="list-style-type: none"> <li>RV610/DEC30(D-2)</li> <li>RV601/DEC30(C-1)</li> </ul>

#### 11-4-30. VITC Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>VITC REC SW: ON (front panel)</li> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> <li>Waveform monitor</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>A = 0.56±0.03 V</p>	<ul style="list-style-type: none"> <li>RV509/DEC30(C-3)</li> </ul>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>VITC REC SW: ON (front panel)</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>EE mode</li> <li>Waveform monitor</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p> <p>A = 0.56±0.03 V</p>	

### 11-4-31. Video Meter Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>• METER select SW: VIDEO (front panel)</li> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: color bar signal</li> <li>• EE mode</li> <li>• Put the main unit vertically.</li> </ul>	<p>CH-1/CH-2 level meter</p>  <p>The pointer reading should be "+3".</p>	<p>CH-1 meter ② RV9/MT-34</p> <p>CH-2 meter ② RV10/MT-34</p>
	<p>CH-3 level meter</p>  <p>The pointer reading should be "0".</p>	<p>CH-3 meter ② RV11/MT-34</p>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>• METER select SW: VIDEO (front panel)</li> <li>• VIDEO IN: color bar signal</li> <li>• EE mode</li> <li>• Put the unit perpendicular to the floor.</li> </ul>	<p>CH-4 level meter</p>  <p>The pointer reading should be "0".</p>	<p>CH-4 meter ② RV12/MT-34</p>

## 11-5. MDM BOARD ALIGNMENT (EE SYSTEM)

### 11-5-1. Y Ref Sync Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 50% flat field signal</li> <li>EE mode</li> </ul>	<p>TP102/MDM-3P(C-2)</p> <p>A : B = 4 : 5</p> <p>TRIG: TP101/MDM-3P(B-3)</p>	• RV101/MDM-3P(B-2)

### 11-5-2. Y Ref Sync Position Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 50% flat field signal</li> <li>EE mode</li> </ul>	<p>TP102/MDM-3P(C-2)</p> <p>A = <math>2.65 \pm 0.02 \mu\text{sec}</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	• RV611/TG-31(A-2)

### 11-5-3. Y Ref Sync Width Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 50% flat field signal</li> <li>EE mode</li> </ul>	<p>TP102/MDM-3P(C-2)</p> <p>Delay</p> <p>50%</p> <p>A</p> <p>B</p> <p>50%</p> <p>TRIG: TP101/MDM-3P(B-3)</p>	RV612/TG-31(B-2)

### 11-5-4. C Ref Sync Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 75% color bar signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>EE mode</li> </ul>	<p>TP202/MDM-3P(B-2)</p> <p>A</p> <p>B</p> <p>With respect to video level A (100 %), the sync level is as follows: <math>B=120\pm 2\%</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	RV201/MDM-3P(A-2)

### 11-5-5. C Ref Sync Width Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: 75% color bar signal</li> <li>• EE mode</li> </ul>	<p>TP202/MDM-3P(B-2)</p> <p>A</p> <p>50%</p> <p>Delay</p> <p>50%</p> <p><math>A = 1.9 \pm 0.05 \mu\text{sec}</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	<p>• RV614/TG-31(C-2)</p>

### 11-5-6. C Ref Sync Position Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 50% flat field signal</li> <li>EE mode</li> </ul>	<p>CH-1: TP102/MDM-3P(C-2) CH-2: TP202/MDM-3P(B-2)</p> <p>TP102</p> <p>CH-1</p> <p>50%</p> <p>A</p> <p>TP202</p> <p>CH-2</p> <p>50%</p> <p>A=0.25±0.02μsec</p> <p>TRIG: TP101/MDM-3P(B-3)</p>	• RV613/TG-31(B-1)

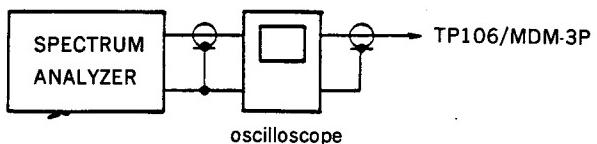
### 11-5-7. Y Pre-emphasis Mix Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 2T pulse/bar signal</li> <li>EE mode</li> </ul>	<p>TP103/MDM-3P(B-2)</p> <p>A</p> <p>B</p> <p>C</p> <p>Spec 1. A=B Spec 2. C=88±2mV</p> <p>TRIG: TP101/MDM-3P(B-3)</p>	<p>Spec 1. • RV102/MDM-3P(B-2)</p> <p>Spec 2. • RV103/MDM-3P(B-2)</p>

### 11-5-8. C Pre-emphasis Mix Level Adjustment

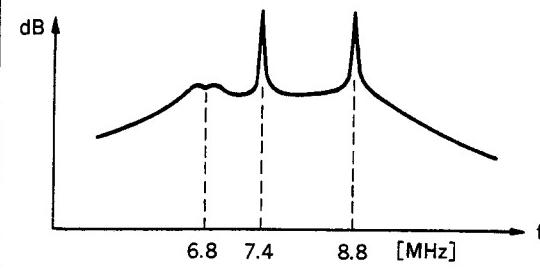
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 2T pulse/bar signal</li> <li>EE mode</li> </ul>	TP203/MDM-3P(A-2)  Spec 1. A=B Spec 2. C=95±2mV TRIG: TP101/MDM-3P(B-3)	Spec 1. • RV202/MDM-3P(A-2) Spec 2. • RV203/MDM-3P(A-2)

### 11-5-9. Y Modulator Deviation/Carrier Set Adjustment



Before performing this adjustment, perform section 11-1-9. Y Output Level Adjustment (MDM-3P Board).

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: 100% flat field signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>EE mode</li> <li>Adjust with a spectrum analyzer.</li> </ul>	TP106/MDM-3P(B-3)  Deviation adjustment Adjust the gap between two peak values to 1.4 MHz. Carrier adjustment Adjust the small peak value on the left to 6.8 MHz.	Deviation adjustment • RV106/MDM-3P(C-2) Carrier adjustment • RV107/MDM-3P(C-4)

Step 2.

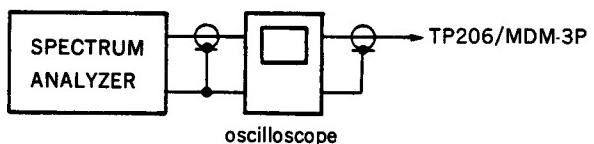
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: 100% flat field signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>EE mode</li> <li>Adjust with a spectrum analyzer.</li> </ul>	TP106/MDM-3P(B-3) <p>Deviation adjustment          Adjust the gap between two peak values to 1.4 MHz          Carrier Adjustment          Adjust the low peak on the left to 4.4 MHz.</p>	Deviation adjustment <input checked="" type="checkbox"/> RV114/MDM-3P(C-2) Carrier adjustment <input checked="" type="checkbox"/> RV108/MDM-3P(C-4)

Step 3.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Supply 75% color bar signal to the VIDEO IN connector, and put the unit into the self-REC/PB mode.</li> <li>Check with a metal tape and an oxide tape.</li> </ul>	TP306/MDM-3P(F-4) <p><math>A = 1.0 \pm 0.01V</math>          When the specification is not satisfied, repeat Steps 1. and 2.</p>	

### 11-5-10. C Modulator Deviation/Carrier Set Adjustment

[Connection]



Before performing this adjustment, perform section 11-1-10. C Output Level Adjustment (MDM-3P Board).

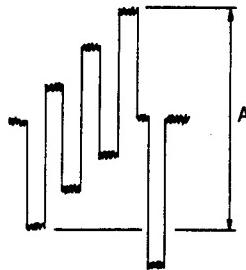
Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: 75% color bar signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>EE mode</li> <li>Adjust with a spectrum analyzer.</li> </ul>	TP206/MDM-3P(A-3) <p>Detailed description: A graph showing a carrier signal with three distinct peaks. The central peak is labeled <math>6.1 \pm 0.005</math> MHz. The peak on the left is labeled 5.6 MHz, and the peak on the right is labeled 6.6 MHz. The y-axis is labeled dB and the x-axis is labeled f.</p>	Deviation adjustment <input checked="" type="radio"/> RV206/DV-7 Carrier adjustment <input checked="" type="radio"/> RV207/MDM-3P(B-4)

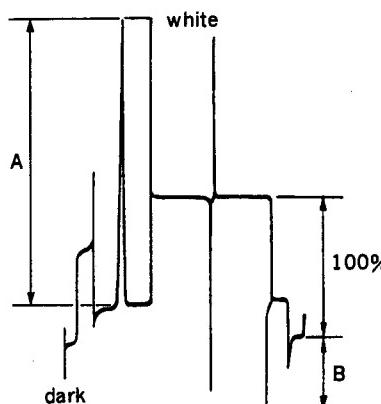
Step 2.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: 75% color bar signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>EE mode</li> <li>Adjust with a spectrum analyzer.</li> </ul>	TP206/MDM-3P(A-3) <p>Detailed description: A graph showing a carrier signal with three distinct peaks. The central peak is labeled <math>4.5 \pm 0.005</math> MHz. The peak on the left is labeled 4.0 MHz, and the peak on the right is labeled 5.0 MHz. The y-axis is labeled dB and the x-axis is labeled f.</p>	Deviation adjustment <input checked="" type="radio"/> RV214/DV-7 Carrier adjustment <input checked="" type="radio"/> RV208/MDM-3P(B-4)

Step3

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: 75 % color bar signal</li> <li>Self-REC/PB mode</li> <li>Check with a metal tape and an oxide tape.</li> </ul>	TP406/MDM-3P(D-4)  $A = 0.70 \pm 0.01V$ (Measured in the noise center) When the specification is not satisfied, repeat Steps 1. and 2.	

#### 11-5-11. Y White/Dark Clip Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 2T pulse/bar signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>EE mode</li> </ul>	TP105/MDM-3P(B-3)  with respect to VIDEO+SYNC 100% white : $A = 221.4 \pm 2.5\%$ dark : $B = 65 \pm 2.5\%$ TRIG: TP101/MDM-3P(B-3)	white clip adjustment <span style="color: blue;">●</span> RV104/MDM-3P(B-3) dark clip adjustment <span style="color: blue;">●</span> RV105/MDM-3P(B-3)

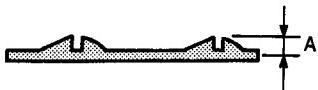
### 11-5-12. Y Dark Clip Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 2T pulse/bar signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>EE mode</li> </ul>	<p>TP105/MDM-3P(B-3)</p> <p>with respect to VIDEO + SYNC 100% dark: <math>B = 100 \pm 2.5\%</math></p> <p>TRIG: TP101/MDM-3P(B-3)</p>	<p>dark clip adjustment • RV113/MDM-3P(B-3)</p>

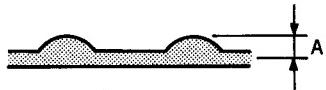
### 11-5-13. C High/Low Clip Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 75% color bar signal</li> <li>Insert a BCT-20K cassette tape.</li> <li>EE mode</li> </ul>	<p>TP205/MDM-3P(A-3)</p> <p>with respect to VIDEO + SYNC 100% high : <math>A = 350 \pm 5\%</math> low : <math>B = 165 \pm 5\%</math></p> <p>TRIG : TP101/MDM-3P(B-3)</p>	<p>high-clip adjustment • RV204/MDM-3P(A-3) low-clip adjustment • RV205/MDM-3P(A-3)</p>

#### 11-5-14. Y REC HF Adjustment

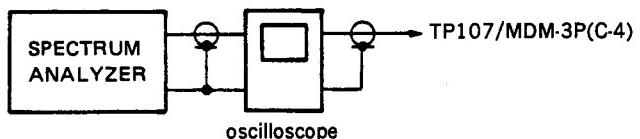
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: H sweep 140% signal</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• EE mode</li> </ul>	TP108/MDM-3P(C-4)  $A = 50 \pm 2 \text{mV}$ (measured in the waveform center)	RV109/MDM-3P(C-4)
	TP107/MDM-3P(C-4)  $A = 500 \pm 10 \text{mV}$	RV110/MDM-3P(C-4)

#### 11-5-15. C REC HF Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: H sweep 140% signal</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• EE mode</li> </ul>	TP208/MDM-3P(A-3)  $A = 20 \pm 1 \text{ mV}$ (measured in the waveform center)	RV209/MDM-3P(B-3)
	TP207/MDM-3P(A-4)  $A = 350 \pm 10 \text{ mV}$	RV210/MDM-3P(B-4)

### 11-5-16. Y Modulator Secondary Distortion Adjustment

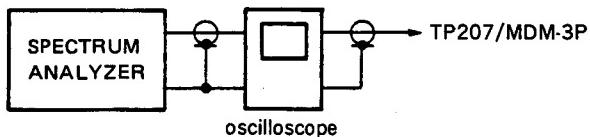
[Connection]



Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 50% flat field signal</li> <li>Insert a BCT-20M cassette tape</li> <li>EE mode</li> <li>After the adjustment, insert a BCT-20K cassette tape and check that Spec 2. is satisfied.</li> </ul>	TP107/MDM-3P(C-4) <p>Minimize the second higher harmonic level.</p> <p>Spec 1. <math>A \geq 45\text{dB}</math> (METAL)</p> <p>Spec 2. <math>A \geq 40\text{dB}</math> (OXDIE)</p>	<input checked="" type="radio"/> RV111/MDM-3P(B-4)

### 11-5-17. C Modulator Secondary Distortion Adjustment

[Connection]

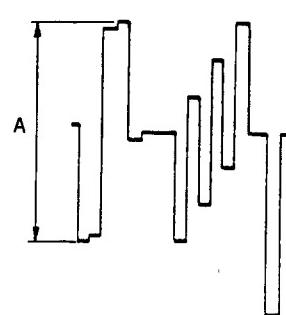


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: flat field 3 signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>EE mode</li> <li>After the adjustment, insert a BCT-20K cassette tape and check that the Spec 2. is satisfied.</li> </ul>	TP207/MDM-3P(A-4) <p>Minimize the second higher harmonic level.  Spec 1. <math>A \geq 45</math> dB (METAL)  Spec 2. <math>A \geq 35</math> dB (OXDIE)</p>	RV211/MDM-3P(A-4)

### 11-5-18 EE DUB Y Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: 75% color bar signal</li> <li>EE mode</li> </ul>	TP306/MDM-3P(F-4) <p><math>A = 1 \pm 0.01</math> V</p> <p>TRIG: TP101/MDM-3P(B-3)</p>	RV112/MDM-3P(C-2)

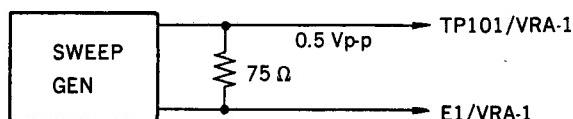
### 11-5-19. EE DUB CTDM Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: 75% color bar signal</li> <li>• EE mode</li> </ul>	<p>TP406/MDM-3P(D-4)</p>  <p>A = 0.78 ± 0.01V</p> <p>TRIG: TP101/MDM-3P(B-3)</p>	<p>• RV212/MDM-3P(C-2)</p>

## 11-6. VRA BOARD ALIGNMENT

### 11-6-1. Y REC Current Frequency Response Adjustment (METAL)

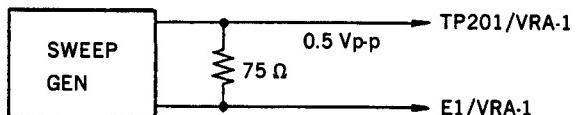
[Connection]



Machine conditions for adjustment	Specifications	Adjustments				
<ul style="list-style-type: none"> <li>Remove CN1 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Connect the SWEEP GEN described above, and supply the RF sweep signal.</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> <li>After the adjustment, mount the CN1 on the VRA-1 Board.</li> </ul>	<p>CH-A: TP102/VRA-1 CH-B: TP103/VRA-1</p> <p style="text-align: center;">   <b>frequency</b>      <b>level</b>  <table border="1"> <tr> <td>2MHz</td> <td>100% reference</td> </tr> <tr> <td>10MHz</td> <td>70%±20</td> </tr> </table> </p> <p>TRIG: TP44/SV-94P(J-1)</p>	2MHz	100% reference	10MHz	70%±20	<p>CH-A: ● RV107/VRA-1</p> <p>CH-B: ● RV109/VRA-1</p>
2MHz	100% reference					
10MHz	70%±20					

## 11-6-2. C REC Current Frequency Response Adjustment (METAL)

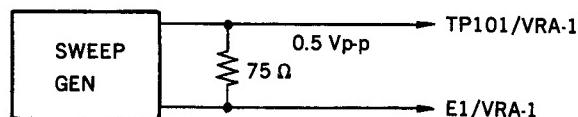
[Connection]



Machine conditions for adjustment	Specifications	Adjustments						
<ul style="list-style-type: none"> <li>Remove CN1 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Connect the SWEEP GEN described above, and supply RF sweep signal.</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> <li>After the adjustment, mount CN1 on the VRA-1 Board.</li> </ul>	<p>CH-A: TP202/VRA-1 CH-B: TP203/VRA-1</p> <table border="1"> <thead> <tr> <th>frequency</th> <th>level</th> </tr> </thead> <tbody> <tr> <td>2MHz</td> <td>100% reference</td> </tr> <tr> <td>10MHz</td> <td>60%<sup>+20</sup>/<sub>-10</sub></td> </tr> </tbody> </table> <p>TRIG: TP44/SV-94P(J-1)</p>	frequency	level	2MHz	100% reference	10MHz	60% <sup>+20</sup> / <sub>-10</sub>	<p>CH-A: <input checked="" type="checkbox"/> RV207/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV209/VRA-1</p>
frequency	level							
2MHz	100% reference							
10MHz	60% <sup>+20</sup> / <sub>-10</sub>							

### 11-6-3. Y REC Current Frequency Response Adjustment (OXIDE)

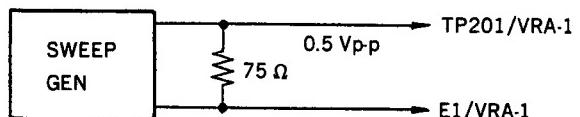
[Connection]



Machine conditions for adjustment	Specifications	Adjustments						
<ul style="list-style-type: none"> <li>Remove CN1 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Connect the SWEEP GEN described above, and supply RF sweep signal.</li> <li>Insert a BCT-20K cassette tape.</li> <li>REC mode</li> <li>After the adjustment, mount CN1 on the VRA-1 Board.</li> </ul>	<p>CH-A: TP102/VRA-1 CH-B: TP103/VRA-1</p> <table border="1"> <thead> <tr> <th>frequency</th> <th>level</th> </tr> </thead> <tbody> <tr> <td>2MHz</td> <td>100% reference</td> </tr> <tr> <td>10MHz</td> <td>70%<sup>+20</sup>/<sub>-10</sub></td> </tr> </tbody> </table> <p>TRIG: TP44/SV-94P(J-1)</p>	frequency	level	2MHz	100% reference	10MHz	70% <sup>+20</sup> / <sub>-10</sub>	<p>CH-A: <input checked="" type="checkbox"/> RV108/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV110/VRA-1</p>
frequency	level							
2MHz	100% reference							
10MHz	70% <sup>+20</sup> / <sub>-10</sub>							

#### 11-6-4. C REC Current Frequency Response Adjustment (OXIDE)

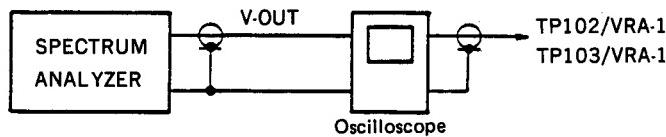
[Connection]

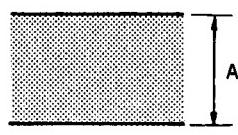
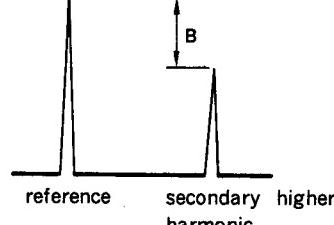


Machine conditions for adjustment	Specifications	Adjustments						
<ul style="list-style-type: none"> <li>Disconnect CN1 on the VRA-1 Board.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: color bar signal</li> <li>Connect the SWEEP GEN described above, and supply RF sweep signal.</li> <li>Insert a BCT-20K cassette tape.</li> <li>REC mode</li> <li>After the adjustment, connect CN1 on the VRA-1 Board.</li> </ul>	<p>CH-A: TP202/VRA-1 CH-B: TP203/VRA-1</p> <table border="1"> <thead> <tr> <th>frequency</th> <th>level</th> </tr> </thead> <tbody> <tr> <td>2MHz</td> <td>100% reference</td> </tr> <tr> <td>10MHz</td> <td>60%<sup>+20</sup><sub>-15</sub></td> </tr> </tbody> </table> <p>TRIG: TP44/SV-94P(J-1)</p>	frequency	level	2MHz	100% reference	10MHz	60% <sup>+20</sup> <sub>-15</sub>	<p>CH-A: • RV208/VRA-1</p> <p>CH-B: • RV210/VRA-1</p>
frequency	level							
2MHz	100% reference							
10MHz	60% <sup>+20</sup> <sub>-15</sub>							

### 11-6-5. Y REC Amp Secondary Distortion Adjustment

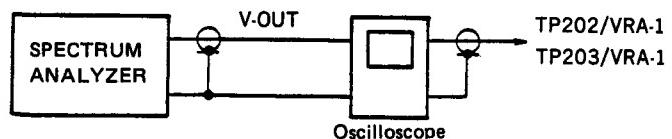
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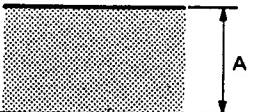
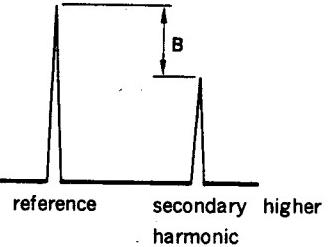


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: flat field signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> </ul>	<p>CH-A: TP102/VRA-1 CH-B: TP103/VRA-1</p>  <p>A = 600±30mV</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	<p>CH-A: <input checked="" type="checkbox"/> RV102/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV104/VRA-1</p>
	<p>spectrum analyzer</p>  <p>Minimize the secondary higher harmonic level. (B≥40 dB)</p>	<p>CH-A: <input checked="" type="checkbox"/> RV105/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV106/VRA-1</p>

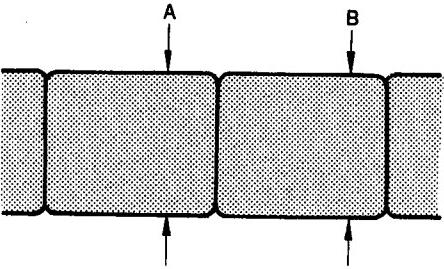
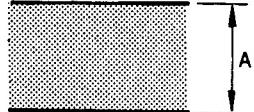
### 11-6-6. C REC Amp Secondary Distortion Adjustment

[Connection]

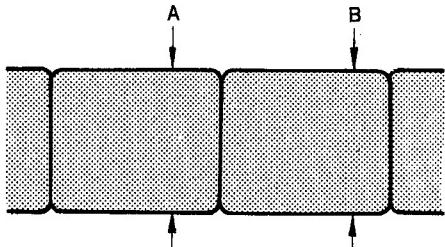


Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: flat field signal</li> <li>Insert a BCT-20M cassette tape.</li> <li>REC mode</li> </ul>	<p>CH-A: TP202/VRA-1 CH-B: TP203/VRA-1</p>  <p>A = <math>700 \pm 10\text{mV}</math></p> <p>TRIG: TP408/MDM-3P(F-1)</p>	<p>CH-A: • RV202/VRA-1</p> <p>CH-B: • RV204/VRA-1</p>
	<p>spectrum analyzer</p>  <p>Minimize the secondary higher harmonic level. (B ≥ 40 dB)</p>	<p>CH-A: • RV205/VRA-1</p> <p>CH-B: • RV206/VRA-1</p>

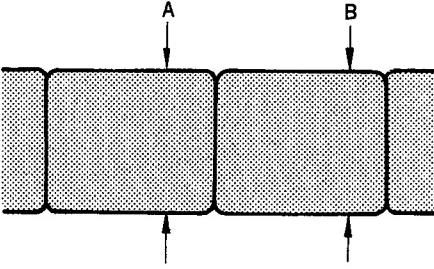
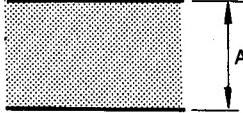
### 11-6-7. Y REC Current Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<p>Step 1.</p> <ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA Y IN: flat field 1 signal</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• REC mode</li> </ul>	<p>TP301/MDM-3P(F-3)</p>  <p>Maximize the amplitude A and B.</p> <p>TRIG: TP308/MDM-3P(F-3)</p>	<p>CH-A: <input checked="" type="checkbox"/> RV102/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV104/VRA-1</p>
<p>Step 2.</p> <ul style="list-style-type: none"> <li>• Play back the self recorded portion on the BCT-20M cassette tape.</li> <li>• Maximize the RF level with the TRACKING control VR.</li> </ul>	<p>Check: <math>A=B=0.5 \pm 0.1</math> V (The voltage difference between CH-A and CH-B should be within 0.1V)</p> <p>TRIG: TP308/MDM-3P(F-3)</p> <p>CH-A: TP102/VRA-1 CH-B: TP103/VRA-1</p>  <p>Check: <math>A=600 \pm 100</math> mV</p>	

### 11-6-8. Y REC Current Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<p>Step 1.</p> <ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA Y IN: flat field 1</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> </ul>	<p>TP301/MDM-3P(F-3)</p>  <p>Spec 1. Maximize the amplitude of A and B. Spec 2. <math>A=B=</math>Value on TP102 or TP103/VRA-1+50mV</p> <p>TRIG: TP308/MDM-3P(F-3)</p>	<p>CH-A: ● RV101/VRA-1</p> <p>CH-B: ● RV103/VRA-1</p>
<p>Step 2.</p> <ul style="list-style-type: none"> <li>• Play back the self recorded portion on the BCT-20K cassette tape.</li> <li>• Maximize the RF level with the TRACKING control VR.</li> </ul>	<p>Check: <math>A=B=0.5 \pm 0.1</math> V (The voltage difference between CH-A and CH-B should be within 0.1V)</p> <p>TRIG: TP308/MDM-3P(F-3)</p> <p>CH-A: TP102/VRA-1 CH-B: TP103/VRA-1</p>  <p>Check: <math>A=430 \pm 80</math> mV</p>	

### 11-6-9. C REC Current Adjustment (METAL)

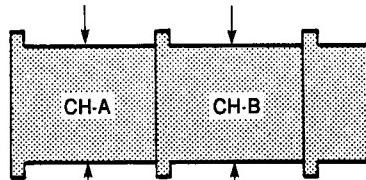
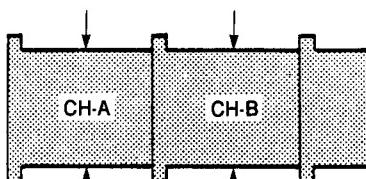
Machine conditions for adjustment	Specifications	Adjustments
<p>Step 1.</p> <ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA C IN: flat field 3</li> <li>• Insert a BCT-20M cassette tape.</li> <li>• REC mode</li> </ul>	<p>TP401/MDM-3P(D-3)</p>  <p>Spec 1. Maximize the amplitude of A and B. Spec 2. <math>A=B=</math>Value on TP202 or TP203/VRA-1 – 200 mV</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	<p>CH-A: <input checked="" type="checkbox"/> RV202/VRA-1</p> <p>CH-B: <input checked="" type="checkbox"/> RV204/VRA-1</p>
<p>Step 2.</p> <ul style="list-style-type: none"> <li>• Play back the self recorded portion on the BCT-20M cassette tape.</li> <li>• Maximize the RF level with the TRACKING control VR.</li> </ul>	<p>Check: <math>A=B=0.5 \pm 0.1</math> V (The voltage difference between CH-A and CH-B should be within 0.1V.)</p> <p>TRIG: TP408/MDM-3P(F-1)</p> <p>CH-A: TP202/VRA-1 CH-B: TP203/VRA-1</p>  <p>Check: <math>A=500 \pm 70</math> mV</p>	

### 11-6-10. C REC Current Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<p>Step 1.</p> <ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA C IN: flat field 3</li> <li>• Insert a BCT-20K cassette tape.</li> <li>• REC mode</li> </ul>	<p>TP401/MDM-3P(D-3)</p> <p>Maximize the amplitude of A and B.</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	<p>CH-A: ● RV201/VRA-1</p> <p>CH-B: ● RV203/VRA-1</p>
<p>Step 2.</p> <ul style="list-style-type: none"> <li>• Play back the self recorded portion on the BCT-20K cassette tape.</li> <li>• Minimize the RF level with the TRACKING control VR.</li> </ul>	<p>Check: <math>A=B=0.5 \pm 0.1V</math> (The voltage difference between CH-A and CH-B should be within 0.1V.)</p> <p>TRIG: TP408/MDM-3P(F-1)</p> <p>CH-A: TP202/VRA-1 CH-B: TP203/VRA-1</p> <p>Check: <math>A = 340^{+100}_{-40} \text{ mV}</math></p>	

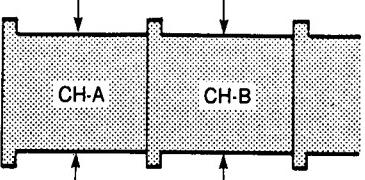
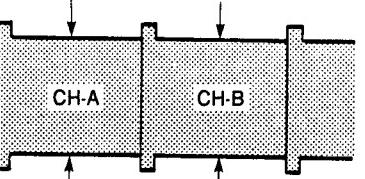
### 11-6-11. Overall Y/C RF Balance/Level Adjustment

#### Step 1. Y/C RF BALANCE/LEVEL CHECK (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: flat field 3</li> <li>• Insert a BCT-20M cassette tape, and put the unit into the self REC/PB mode.</li> <li>• TRACKING: Maximize the RF level</li> </ul>	<p>[Y RF balance/level] TP301/MDM-3P(F-3)</p>  <p>Spec 1. <math>CH-A = CH-B = 0.50 \pm 0.1 V</math>        Spec 2. The voltage difference between CH-A and CH-B should be within 0.05 V.</p> <p>TRIG: TP308/MDM-3P(F-3)</p>	
	<p>[C RF balance/level] TP401/MDM-3P(D-3)</p>  <p>Spec 1. <math>CH-A = CH-B = 0.5 \pm 0.1 V</math>        Spec 2. The voltage difference between CH-A and CH-B should be within 0.05 V.</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	

\* 1. When the specification in the Step 1. is not satisfied, perform section 11-6-7 and 11-6-9 within the specification.

Step 2. Y/C RF BALANCE/LEVEL CHECK (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: flat field 3</li> <li>Insert a BCT-20K cassette tape, and put the unit into the self REC/PB mode.</li> <li>TRACKING: Maximize the RF level</li> </ul>	<p>[Y RF balance/level] TP301/MDM-3P(F-3)</p>  <p>Spec 1. <math>CH-A = CH-B = 0.5 \pm 0.1 V</math>      Spec 2. The voltage difference between CH-A and CH-B should be within 0.1V</p> <p>TRIG: TP308/MDM-3P(F-3)</p>	
	<p>[C RF balance/level] TP401/MDM-3P(D-3)</p>  <p>Spec 1. <math>CH-A = CH-B = 0.5 \pm 0.1 V</math>      Spec 2. The voltage difference between CH-A and CH-B should be within 0.1V.</p> <p>TRIG: TP408/MDM-3P(F-1)</p>	

\* 2 When the specification in Step 2. is not satisfied, perform section 11-6-8 and 11-6-10 within the specification.

### 11-6-12. Overall Y Frequency Response Check

Machine conditions for adjustment	Specifications	Adjustments																												
<ul style="list-style-type: none"> <li>Set the S1 on the ENC-6P Board (C-1) to the ON position.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: multi-burst signal</li> <li>Insert a BCT-20M cassette tape, and put the unit into the self-REC/PB mode.</li> <li>After the adjustment, insert a BCT-20K cassette tape, and put the unit into the self-REC/PB mode.</li> </ul>	<p>TP132/ENC-6P (H-2)</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.5MHz</td> <td>100% Reference</td> </tr> <tr> <td>1 MHz</td> <td>100±5%</td> </tr> <tr> <td>2 MHz</td> <td>100±5%</td> </tr> <tr> <td>4 MHz</td> <td>100±10%</td> </tr> <tr> <td>5 MHz</td> <td>100±5%</td> </tr> <tr> <td>5.5MHz</td> <td>100±5%</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.5MHz</td> <td>100% Reference</td> </tr> <tr> <td>1 MHz</td> <td>100±5%</td> </tr> <tr> <td>2 MHz</td> <td>100±5%</td> </tr> <tr> <td>4 MHz</td> <td>100±5%</td> </tr> <tr> <td>5 MHz</td> <td>100±5%</td> </tr> <tr> <td>5.5MHz</td> <td>100±5%</td> </tr> </tbody> </table>	Frequency	Level	0.5MHz	100% Reference	1 MHz	100±5%	2 MHz	100±5%	4 MHz	100±10%	5 MHz	100±5%	5.5MHz	100±5%	Frequency	Level	0.5MHz	100% Reference	1 MHz	100±5%	2 MHz	100±5%	4 MHz	100±5%	5 MHz	100±5%	5.5MHz	100±5%	
Frequency	Level																													
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4 MHz	100±5%																													
5 MHz	100±5%																													
5.5MHz	100±5%																													

\* When the specification is not satisfied, perform 11-6-14. Overall Y/C Frequency Response Adjustment.

### 11-6-13. Overall C Frequency Response Check

Machine conditions for adjustment	Specifications	Adjustments																				
<ul style="list-style-type: none"> <li>Set S1 on the ENC-6P Board (C-1) to the ON position.</li> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: multi-burst signal</li> <li>Insert a BCT-20M cassette tape, and put the unit into the self-REC/PB mode.</li> <li>After the adjustment, insert a BCT-20K cassette tape and put the unit into the self-REC/PB mode.</li> </ul>	<p>TP2/CEC-3P(F-2)</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.2MHz</td> <td>100% Reference</td> </tr> <tr> <td>0.5MHz</td> <td>100±5%</td> </tr> <tr> <td>1 MHz</td> <td>100±10%</td> </tr> <tr> <td>1.5MHz</td> <td>100±5%</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>0.2MHz</td> <td>100% Reference</td> </tr> <tr> <td>0.5MHz</td> <td>100±5%</td> </tr> <tr> <td>1 MHz</td> <td>100±5%</td> </tr> <tr> <td>1.5MHz</td> <td>100±5%</td> </tr> </tbody> </table>	Frequency	Level	0.2MHz	100% Reference	0.5MHz	100±5%	1 MHz	100±10%	1.5MHz	100±5%	Frequency	Level	0.2MHz	100% Reference	0.5MHz	100±5%	1 MHz	100±5%	1.5MHz	100±5%	
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Frequency	Level																					
0.2MHz	100% Reference																					
0.5MHz	100±5%																					
1 MHz	100±5%																					
1.5MHz	100±5%																					

\* When the specification is not satisfied, perform section 11-6-14. Overall Y/C Frequency Response Adjustment.

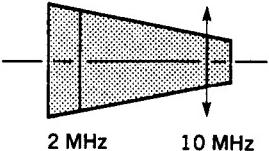
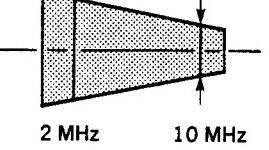
#### 11-6-14. Overall Y/C Frequency Response Adjustment

When performing this step, refer to the sections as follows.

11-6-1, 11-6-3. Y REC Current Frequency Response Adjustment (METAL)(OXIDE)

11-6-2, 11-6-4. C REC Current Frequency Response Adjustment (METAL)(OXIDE)

Perform adjustment for both Y and C.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>When Y frequency response adjustment This is same as section 11-6-1 and 11-6-3.</li> </ul>	<p>[When high-range level is higher in step 1.]</p> <ul style="list-style-type: none"> <li>Y adjustment CH-A : TP102/VRA-1 CH-B : TP103/VRA-1.</li> <li>C adjustment CH-A : TP202/VRA-1 CH-B : TP203/VRA-1</li> </ul>  <p>Raise the 10 MHz level.</p>	<ul style="list-style-type: none"> <li>Y adjustment (METAL) CH-A : <input checked="" type="checkbox"/> RV107/VRA-1 CH-B : <input checked="" type="checkbox"/> RV109/VRA-1</li> <li>Y adjustment (OXIDE) CH-A : <input checked="" type="checkbox"/> RV108/VRA-1 CH-B : <input checked="" type="checkbox"/> RV110/VRA-1</li> <li>C adjustment (METAL) CH-A : <input checked="" type="checkbox"/> RV207/VRA-1 CH-B : <input checked="" type="checkbox"/> RV209/VRA-1</li> <li>C adjustment (OXIDE) CH-A : <input checked="" type="checkbox"/> RV208/VRA-1 CH-B : <input checked="" type="checkbox"/> RV210/VRA-1</li> </ul>
	<p>[When high-range level is lower in step 1.]</p> <ul style="list-style-type: none"> <li>Y adjustment CH-A : TP102/VRA-1 CH-B : TP103/VRA-1</li> <li>C adjustment CH-A : TP202/VRA-1 CH-B : TP203/VRA-1</li> </ul>  <p>Raise the 10 MHz level.</p>	

After the adjustment, perform check item in the following adjustment.

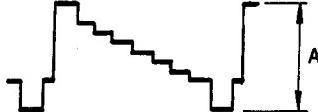
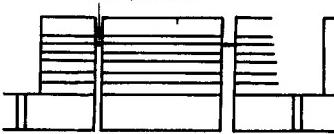
11-6-7. Y REC Current Adjustment (METAL)

11-6-8. Y REC Current Adjustment (OXIDE)

11-6-9. C REC Current Adjustment (METAL)

11-6-10. C REC Current Adjustment (OXIDE)

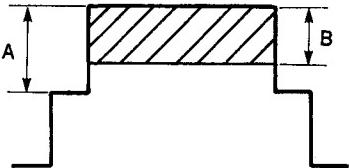
### 11-6-15. CONFI Output Level Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Connect pin 14 of CN1 on the MDM-3P Board (D-4) to GND with a shorting clip.</li> <li>CONFI SW: Y</li> <li>Play back the color bar (DO) signal on the alignment tape CR5-1B PS.</li> </ul>	<p>Step 1. VIDEO OUT Connector (terminated at 75ohms)</p>  <p><math>A = 1.0 \pm 0.1 \text{ V}</math></p> <p>TRIG: TP308/MDM-3P(F-3)</p>	• RV1(IC505)/MDM-3P(E-1)
<ul style="list-style-type: none"> <li>CNFI SW: C</li> <li>After the adjustment, remove the shorting clips.</li> <li>Set the CONFI SW to OFF.</li> </ul>	<p>Step 2. VIDEO OUT connector (terminated at 75 ohms)</p> <p>DO portion</p>  <p>Coincide DO portion with the 3rd step.</p> <p>* Repeat Step 1. and 2 until the value satisfy the specification.</p> <p>TRIG: TP308/MDM-3(F-3)</p>	• RV2(IC505)/MDM-3P(E-1)
	<p>Step 3. VIDEO OUT Connector (terminated at 75ohms)</p>  <p><math>A = 0.5 \pm 0.1 \text{ V}</math></p>	

## 11-7. VIDEO OVERALL PHASE ADJUSTMENT

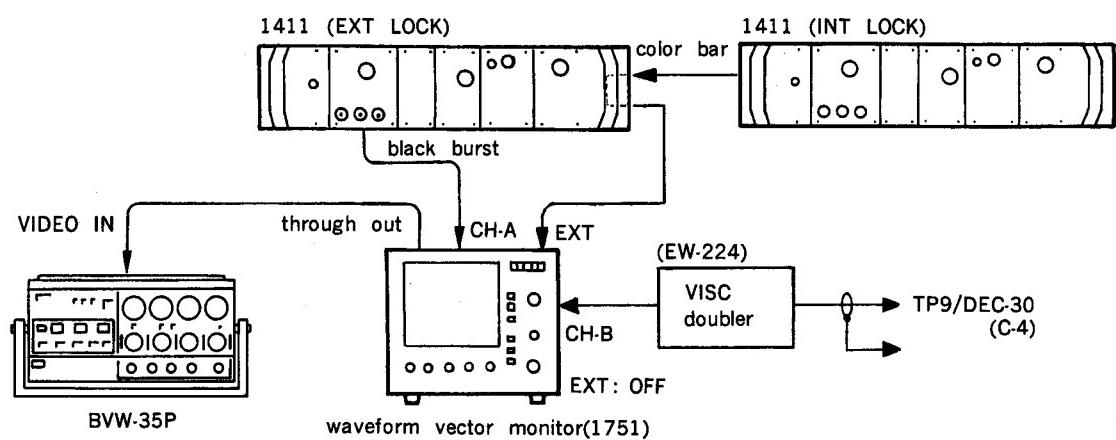
### 11-7-1. VISC Adjustment

Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Turn RV505 on the DEC-30 Board (E-2) fully clockwise direction.</li> <li>Set RV506 on the DEC-30 Board (E-2) to the mechanical center position.</li> <li>VIDEO IN: black burst signal</li> <li>EE mode</li> <li>waveform vector monitor: WFM mode (line selector 8 line)</li> </ul>	TP9/DEC-30(C-4)  <p>Spec 1 : A = <math>0.35 \pm 0.01</math>V Spec 2 : B = <math>0.3 \pm 0.01</math>V</p>	Spec 1. <input checked="" type="checkbox"/> RV507/DEC-30(E-2) Spec 2. <input checked="" type="checkbox"/> RV505/DEC-30(E-2)

Step 2.

[Connection]



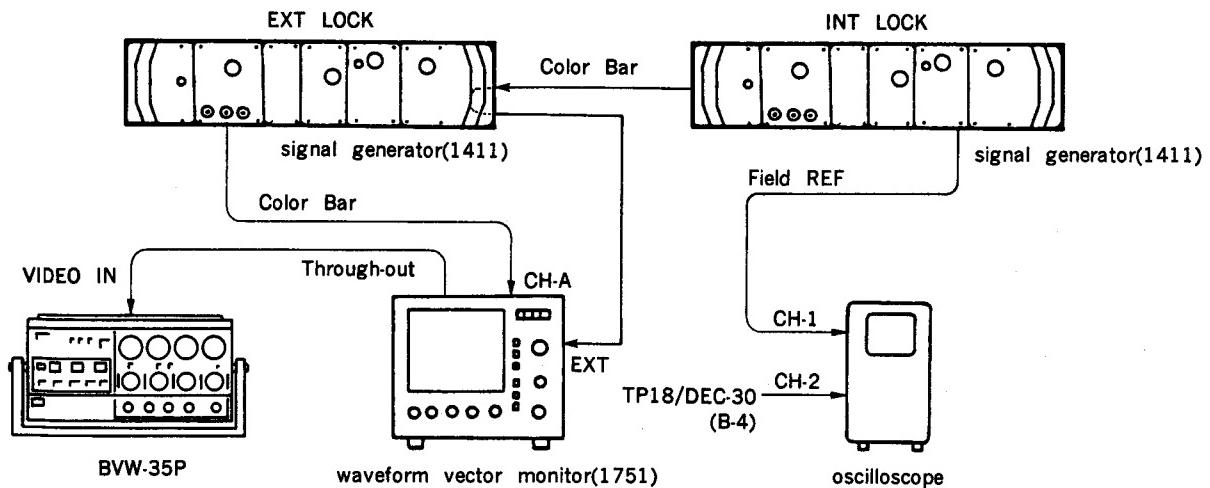
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: black burst signal</li> <li>EE mode</li> <li>Set SCH phase to zero degree with the SC PHASE control knob on the signal generator.</li> </ul>	waveform vector monitor  [vector mode]	<input checked="" type="checkbox"/> RV506/DEC-30(E-2)

### 11-7-2. VISC Mute Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> <li>waveform monitor: WFM mode (line selector 8 line)</li> </ul>	VIDEO OUT connector (terminated at 75ohms)  A → 0	<input checked="" type="checkbox"/> RV401/ENC-6P(E-1)

### 11-7-3. CF ID Pulse Adjustment

[Connection]



Step 1.

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO Level: center clicked position</li> <li>VIDEO IN: color bar signal</li> <li>EE mode</li> <li>Set the SCH phase to the 0-degree position with the SC PHASE control knob on the EXT LOCK 1411.</li> </ul>	<p>Waveform vector monitor</p> <p>[SCH mode]</p>	SC PHASE control knob on the signal generator

Step 2.

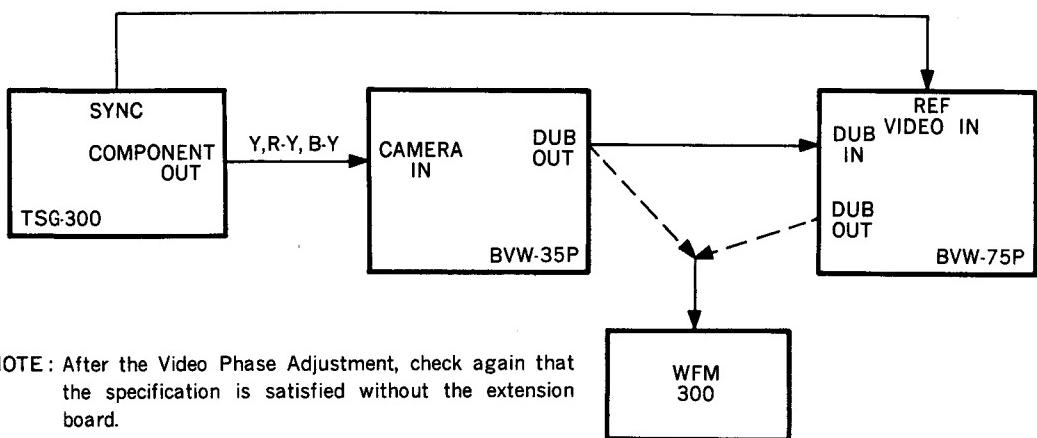
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Connect TP19 on the DEC-30 Board (A-2) to GND with a shorting clip.</li> <li>• Turn temporarily RV605 on the DEC-30 Board (A-3) fully clockwise direction.</li> <li>• VIDEO level: Center clicked position</li> <li>• VIDEO IN: color bar signal</li> <li>• EE mode</li> <li>• Adjust the field signal with an oscilloscope.</li> <li>• After the adjustment, remove the shorting clip.</li> </ul>	<p>Field REF</p> <p>TP18/DEC-30(B-4)</p> <p>OK:</p> <p>NG:</p> <p>TRIG: SG Field REF</p>	• RV605/DEC-30(A-3)

Step 3.

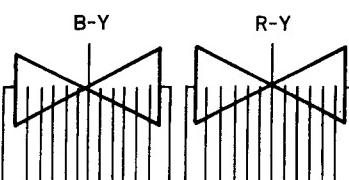
Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• Turn the SC PHASE control knob on the signal generator, and shift the phase by <math>\pm 80</math> degrees.</li> <li>• Check the specification in Step 2.</li> <li>• VIDEO level: Center clicked position</li> <li>• VIDEO IN: color bar signal</li> <li>• EE mode</li> </ul>	<p>Waveform vector monitor</p> <p>[SCH mode]</p> <p>When the specification in Step 2. is not satisfied, readjust from Step 2.</p>	SH PHASE control knob on the signal generator.

#### 11-7-4. Video Phase Adjustment

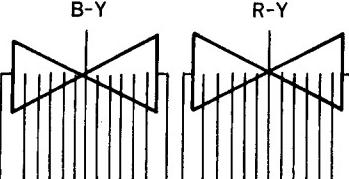
[Connection]



##### Step 1. BVW-75P Check

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the bowtie &amp; 10T signal on the alignment tape CR51B PS with a BVW-75P.</li> </ul>	DUB OUT connector/BVW-75P  B-Y                            R-Y C/C delay $0 \pm 5$ nsec Y/C delay $0 \pm 5$ nsec	* When out of specification. C/C delay <input checked="" type="checkbox"/> RV501/TBC-8P(F-1) : BVW-75P  Y/C delay <input checked="" type="checkbox"/> Y/C DELAY/sub panel : BVW-75P

##### Step 2. DUB OUT Y/C Delay Adjustment (EE mode)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: BOWTIE(50%)</li> <li>EE mode</li> </ul>	DUB OUT connector/WFM-300  B-Y                            R-Y Y/C delay $0 \pm 20$ nsec	<input checked="" type="checkbox"/> RV139/ENC-6P(G-1)

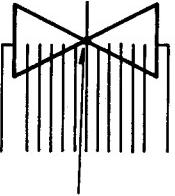
### 11-7-5. PB C/C, Y/C Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
• Play back the bowtie & 10T signal on the alignment tape CR5-1B PS.	<p>DUB OUT connector/WFM-300</p> <p>C/C delay</p> <p>Equalize amount of delay</p> <p><math>0 \pm 10 \text{ nsec}</math></p>	• RV1/EQ-23 [A160] : CEC-3P(E-2)
	<p>Y/C delay</p> <p><math>0 \pm 10 \text{ nsec}</math></p>	• RV501/ENC-6P(C-1)

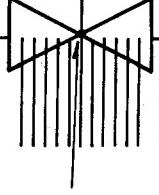
### 11-7-6. PB Y/C Delay Adjustment (Composite)

Machine conditions for adjustment	Specifications	Adjustments
• Play back the Y/C delay portion on the alignment tape CR5-1A PS.	<p>VIDEO OUT connector</p> <p>OK                    OK                    NG                    NG</p> <p>Y delay              Y advance</p>	• RV507/CEC-3P(B-3)

### 11-7-7. Video Phase Adjustment (1)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>Play back the bowtie &amp; 10T signal on the alignment tape CR5-1B PS with a BVW-75P.</li> <li>CAPSTAN LOCK SW/sub panel (BVW-75P): 2FD</li> </ul>	<p>DUB OUT connector/BVW-75P: WFM-300</p>  <p>Coincide the mark in the center with center of the bowtie.</p> <p><math>0 \pm 5 \text{ nsec}</math></p>	<input checked="" type="checkbox"/> SYNC FINE/sub panel : BVW-75P

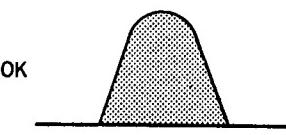
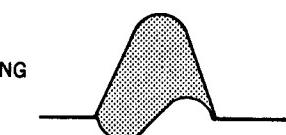
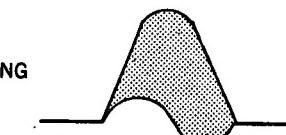
### 11-7-8. Video Phase Adjustment (2)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: bowtie signal (50 %)</li> <li>Connect the DUB OUT connector on the BVW-35P to the DUB IN connector on the BVW-75P</li> <li>Insert a BCT-20M (in the Metal mode adjustment)/ BCT-20K (in the Oxide mode adjustment) cassette tape.</li> <li>INPUT SELECT SW/BVW-75P: CTDM</li> <li>EE mode (Both BVW-35P, and BVW-75P)</li> </ul>	<p>DUB OUT connector/BVW-75P: WFM-300</p>  <p>Coincide the mark in the center with center of the bowtie.</p> <p><math>0 \pm 5 \text{ nsec}</math></p>	Metal <input checked="" type="checkbox"/> RV615/TG-31 : MDM-3P(B-2) Oxide <input checked="" type="checkbox"/> RV616/TG-31 : MDM-3P(B-2)

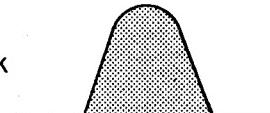
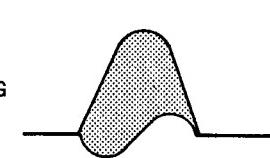
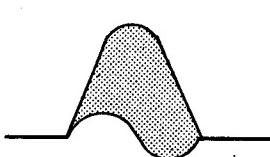
### 11-7-9. Overall C/C, Y/C Delay Adjustment

Machine conditions for adjustment	Specifications	Adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: bowtie signal (50 %)</li> <li>Connect the DUB OUT connector on the BVW-35P to the DUB IN connector on the BVW-75P.</li> <li>Insert a BCT-20M (in the Metal mode adjustment)/BCT-20K (in the Oxide mode adjustment).</li> <li>INPUT SELECT SW/BVV-75P: CTDM</li> <li>EE mode (Both BVW-35P and BVW-75P)</li> </ul>	<p>Equalize amount of the delay</p> <p><math>0 \pm 20 \text{ nsec}</math></p> <p>Coincide the mark in the center with center of the bowtie.</p> <p><math>0 \pm 20 \text{ nsec}</math></p>	<p>Metal</p> <p>• RV1/EQ-23 [A109] : CEC-3P(F-2)</p> <p>Oxide</p> <p>• RV617/MDM-3P</p> <p>• RV618/MDM-3P</p>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN : bowtie signal (50 %)</li> <li>Insert a BCT-20M/BCT-20K cassette tape.</li> <li>Play back the self recorded portion.</li> </ul>	<p>DUB OUT connector/BVV-35P: WFM-300</p> <p>Check that the specification in step 1 is satisfied. When the specification is not satisfied, readjust in step 1 within the specified level.</p>	
<p>Step. 3</p> <ul style="list-style-type: none"> <li>Play back the recorded cassette tape in step 2 with a BVW-75P.</li> </ul>	<p>DUB OUT connector/BVV-75P: WFM-300</p> <p>Check that the specification in step 1 is satisfied. When the specification is not satisfied, readjust in step 1 within the specified level.</p>	

### 11-7-10. Overall Y/C Delay Adjustment (METAL)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>• VIDEO SW: CAMERA</li> <li>• CAMERA IN: pulse/bar signal</li> <li>• Insert a BCT-20M cassette tape, and put the unit into the self-REC/PB mode.</li> </ul>	<p>VIDEO OUT connector (terminated at 75ohms)</p>  <p>NG</p>  <p>chroma advance</p> <p>Turn RV617 slightly counterclockwise direction.</p>  <p>Chroma delay</p> <p>Turn RV617 slightly clockwise direction.</p>	• RV617/TG-31[A102](B-2)
<ul style="list-style-type: none"> <li>• Waveform monitor: LINE SELECTOR OFF</li> </ul>	<p>Spec 1.</p> <p><math>0 \pm 20\text{nsec}</math></p>	
<ul style="list-style-type: none"> <li>• Waveform monitor: LINE SELECTOR 15 LINE Field: 1+3, 2+4</li> </ul>	<p>Spec 2. Difference between fields</p> <p><math>0 \pm 30 \text{ nsec}</math></p> <p>CH-A: 1+3, CH-B: 2+4</p>	

### 11-7-11. Overall Y/C Delay Adjustment (OXIDE)

Machine conditions for adjustment	Specifications	Adjustments
<ul style="list-style-type: none"> <li>VIDEO SW: CAMERA</li> <li>CAMERA IN: pulse/bar signal</li> <li>Insert a BCT-20K cassette tape, and put the unit into the self REC/PB mode.</li> </ul>	<p>VIDEO OUT connector (terminated at 75 ohms)</p>  <p>OK</p>  <p>NG</p> <p>chroma advance</p> <p>Turn RV618 slightly counterclockwise direction.</p>  <p>NG</p> <p>chroma delay</p> <p>Turn RV618 slightly clockwise direction.</p>	<p>RV618/TG-31[A102](B-2)</p>
<ul style="list-style-type: none"> <li>Waverform monitor: LINE SELECTOR OFF</li> </ul>	<p>Spec 1. <math>0 \pm 20</math> nsec</p>	
<ul style="list-style-type: none"> <li>Waverform monitor: LINE SELECTOR 15 LINE Field: 1+3, 2+4</li> </ul>	<p>Spec 2. Difference between fields <math>0 \pm 30</math> nsec CH-A: 1+3, CH-B: 2+4</p>	

